

AGRICULTURAL RESEARCH INSTITUTE
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312148

The Journal

OF THE

Department of Agriculture.

1923-1924.

VOL. XXVII.

THE JOURNAL

OF THE

Department of Agriculture

OF

SOUTH AUSTRALIA.

ISSUED UNDER THE AUTHORITY OF THE HON. MINISTER OF AGRICULTURE.

Vol. XXVII.—August, 1923, to July, 1924.

Adelaide:
R. E. E. ROGERS, GOVERNMENT PRINTER, NORTH TERRACE.

1925.

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THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

No. 1. AUGUST 15, 1923. VOL. XXVII.

Published Monthly by the Department of Agriculture.

Edited by H. J. FINNIS.

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All communications to be addressed:
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G. F. JENKINS,
Minister of Agriculture.

POINTS FOR PRODUCERS.

Agricultural Bureau Conference.

The Annual Conference of Branches of the Agricultural Bureau situated in the Pinnaroo district is to be held at Lameroo on Tuesday, August 28th. Sessions will be held during the morning, afternoon, and evening, at which addresses will be given by Expert Officers of the Department, papers by Branch members, and time devoted to "Free Parliament."

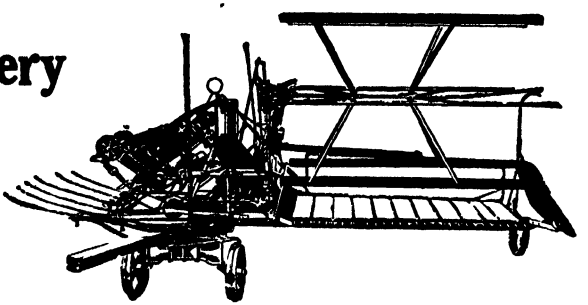
Tobacco Seed.

The Department of Agriculture has procured its supply of tobacco seed for the coming season, and has arranged to secure an additional quantity for the purpose of distribution amongst intending growers. The kinds available are the cigarette and light plug types.

Planting Citrus Trees.

The extraordinary wet and cold weather that has prevailed since the break up of the season has resulted in the soil in many instances being saturated, and wherever the under-drainage is not particularly free, the soils have become water logged. Whilst these conditions prevail it is not desirable to transplant citrus trees into their permanent positions in the orchard. The best results are secured from evergreen trees when they commence to grow almost immediately they are moved from the nursery to the orchard, otherwise the transpiration from the foliage will deplete the moisture in the plant tissues, because the broken root system will not be able to absorb a corresponding amount from the soil. It is, therefore, desirable to defer planting citrus and other evergreen trees until the soil temperature has begun to rise freely, so that root action will be stimulated directly after transplanting. If this is done, the tree begins to push out new growth and recover itself from the injuries received at the time of transplanting. Assuming, on the other hand, that the trees had been lifted, and the roots had not been severely injured, and it were possible for the trees to make a fresh start at once any new shoots that might develop would run a considerable risk of being damaged by frost and low temperatures during the cold nights that occur in July and August. This is one of the reasons why spring planting of evergreens is advocated by the Horticutural Branch of the Department of Agriculture in preference to autumn planting. A fairly good guide to follow as to the best time to begin transplanting in the spring is the first evidence of green shoots in the axils of the leaves. This indicates that temperatures are sufficiently high for the development of the plant, and the growth that is then beginning may as well take place with the tree in its permanent position in the orchard. If the young trees have already produced several inches of tender succulent growth, this, on removal from the nursery, should be cut away in the majority of instances, because it will only die from the effects of root damage in transplanting. The

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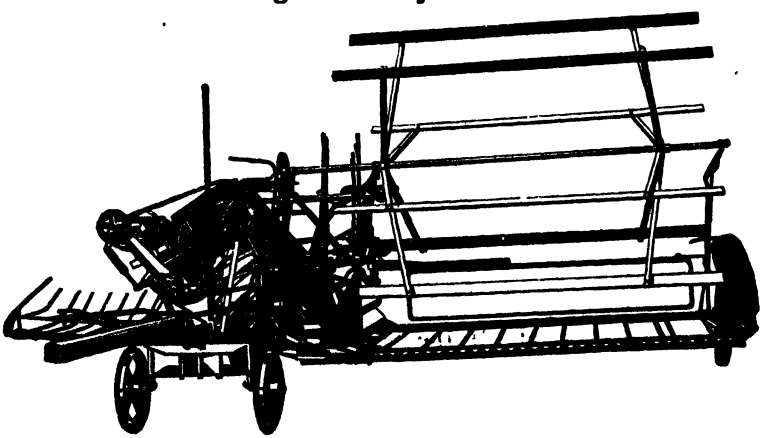
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majority of people appear to be afraid to cut citrus trees sufficiently when they are transplanting them, but when it is considered that the leaves will drain the tree if left in great numbers, the necessity for restricting their action by the removal of most of the lighter twigs carrying the bulk of the leaves is apparent.

Experiments with Raw Rock Phosphates.

Experiments to test the agricultural value of raw rock phosphates were commenced at the Government Experimental Farm, Kybybolite, in 1919. The rock phosphates used are low grade, and contain respectively (*a*) calcium phosphate, and (*b*) aluminium phosphate, equivalent to about 18 per cent. of phosphoric acid.

To test the rock phosphates on crops to be harvested, a rotation consisting of wheat—(for hay)—peas, in which both the wheat and pea crops are dressed with the same fertilisers, was laid down. The results secured from these plots during the past four seasons are as follows:—

Wheaten Hay Yields, 1919-1922.

Plot.	Manuring per Acre.	1919. T.	C.	L.	1920. T.	C.	L.	1921. T.	C.	L.	1922. T.	C.	L.	Means, 1919-22. T.	C.	L.
1	No manure	0	10	84	0	9	0	0	18	84	0	7	21	0	11	47
2	5cwts. lime, 1cwt. superphosphate	1	6	105	0	17	35	0	18	28	2	4	0	1	6	70
3	1cwt. superphosphate	1	7	28	0	13	0	0	17	84	1	12	70	1	2	73
4	1cwt. aluminium phosphate rock	1	6	91	0	12	91	0	14	91	1	6	80	1	0	32
5	1cwt. calcium phosphate rock	1	3	7	0	11	0	0	12	21	1	1	60	0	16	106

Pea Yields, 1919-1922.

Plot.	Manuring per Acre.	1919. B.	L.	1920.	1921. B.	L.	1922. B.	L.	Means, 1919-22. B.	L.
1	No manure	0	30	Total failure.	2	54	5	54	2	19
2	5cwts. lime, 1cwt. superphosphate	1	17		5	26	15	29	5	33
3	1cwt. superphosphate	1	4		7	4	10	45	4	43
4	1cwt. aluminium phosphate rock	1	30		7	10	7	51	4	8
5	1cwt. calcium phosphate rock	0	39		5	45	5	45	3	2

It is noticeable that Plot 2, which is treated with lime and superphosphate, is increasing its advantages over the others in producing wheaten hay, and it has also this year gained considerably in the yield of peas. This plot of hay stood out well above the others all through the season, as also did the plot of peas, the stubble of which produced a growth of wireweed during January and February very much greater than that on other plot stubbles. The results so far secured tend to show that the local aluminium rock is slightly superior to the local calcium rock for this soil.

Hatching Chickens.

On many farms in this State incubators are unknown, and all chickens are hatched by natural methods. Broody hens are not always available until late in the year. Late hatching has long been recognised as a great mistake. Late hatching pullets are not old enough to lay during autumn and winter when the price of eggs is high. They do not lay until the price of eggs is relatively low. This fact, of course, accounts largely for scarcity of eggs in autumn and winter. Late hatched chickens do not develop well, and have less stamina than those hatched earlier in the year. All heavy breeds should be hatched during July and August, and all light breeds, such as Leghorns, should be hatched not later than the end of September. In the hills and South-East a fortnight later may be allowed. Improved laying strains of fowls are responsible for the lessened number of broody hens early in the season. When selecting eggs for hatching, discard any less than 2oz. in weight or that have rough shells or that are misshapen. It is highly important to increase the size of eggs laid by our hens; this can be accomplished by careful selection.

Sale of Fertilisers.

Recently a retailer of fertilisers was proceeded against in the Adelaide Police Court, under the provisions of the Fertilisers Act, for selling a bag of potato manure without giving the purchaser an invoice setting out the contents of the bag and the percentages of the fertilising constituents in the parcel. A conviction without a fine was recorded. This should not be construed as a precedent, but serve to warn retailers of fertilisers of their responsibilities under the Act, which is to be strictly enforced in the future.

Black Spot of the Grape Vines.

Following on the continuous wet weather that is now being experienced in this State, it is more than likely that those vineyards which were affected with black spot during the past season will experience another outbreak with the opening of the new season's growth. Whilst it is not suggested that owners of vineyards in which black spot was not present last year should go to the expense of treating their vines, the Horticultural Branch of the Department of Agriculture suggests that the owners of vineyards which were affected last season would be well advised to take recognised preventive measures against a further outbreak. These consist of swabbing or spraying the vines or at least all of last summer's growth with a solution of sulphate of iron and sulphuric acid. The solution is made up by pouring ½ gallon of sulphuric acid over 50lbs. of sulphate of iron, then dissolving the iron crystals in 10 gallons of boiling water. The effectiveness of the treatment depends entirely upon the thoroughness with which it is carried out. The object is thoroughly to penetrate the wounds made by the disease during the previous summer and destroy the spores of the

disease therein. Another remedy is a ten per cent. solution of sulphuric acid, used as a spray. The use of this, however, demands a sprayer made or lined with lead or some acid resisting substance.

Pruning Deciduous Trees.

Amongst growers of deciduous fruit trees both for commercial purposes and on a small scale there is a tendency to continue methods of pruning which are now recognised as being more or less obsolete. It is not that the principles underlying the practices of pruning have undergone any change. These principles were worked out in the olden countries of the world on the basis of their long experience and observation. The trouble seems to have crept in in the interpretation of these principles and their application to plant habits and growth under local conditions. Whilst it is recognised as desirable during the first two or three seasons after the fruit tree has been planted to prune it severely, first, with the object of balancing the top with the root system, which of necessity has been broken in transplanting, and, secondly, with a view to securing a well-balanced frame work, it does not necessarily follow that each successive annual pruning should be on the lines of stumping back the leaders and cutting out large quantities of lateral wood. To admit an abundance of light into the centre of the tree is of the utmost importance, even in a sunny climate such as that possessed by this State. But after the framework has been established, and the tree has continued to make strong growth, nothing is to be gained, but much to be lost, by severe pruning during the winter season. Should the tree give indications of growing to an undesirable height, cutting back the leaders will not prove a check. This is more likely to result if the leaders are left untopped or the top growth is turned on to lower and suitably placed shoots which are not topped.

With such fruits as the apple, pear, and plum the shortening of the laterals which spread themselves around the outer framework of the tree invariably postpones the productive period, as these fruits bear chiefly on spurs which emerge from these laterals during the second year of their growth. It is the opinion of the Horticultural Branch of the Department of Agriculture that growers lose more fruit as a result of over-pruning than they do as a result of under-pruning orchards in this State.

Veitch's Well Experimental Farm.

The Government Experimental Farm, Veitch, is situated in what is popularly known as the Loxton district. It is about 3,800 acres in area, and is typical of thousands of acres of the surrounding country. The report of the 1922-23 harvest of this farm has just been issued by the Department of Agriculture. This shows that the season was an average one, the total rainfall for the year being 10.28in. and the "useful" rainfall 8.69in. Cropping in the fields was confined to the cereals. An area of 42.94 acres was cut for hay, the average being 1 ton 7cwts. 106lbs. per acre, as compared with the average for the past

13 years, viz., 1 ton 0cwt. 74lbs.; 84.89 acres of oats were harvested for grain, the average being 10bush. 13lbs. per acre. This is much below the average for the farm for the past seven years, viz., 17bush. 25lbs. Barley for grain was grown on 54.69 acres of fallow, and 17.55 acres of "new" land. An average return of 13bush. 6lbs. was reaped, the mean for the farm for the past eight years being 16bush. 7lbs. For wheat 427.84 acres were sown, the average return being 9bush. 52lbs., as compared with the mean for the past 14 years of 10bush. 53lbs. The varieties which showed to advantage were President, Walker's Wonder, Sultan, Canaan, Queen Fan, and Triumph.

The permanent experimental work being conducted on this farm includes—(*a*) manurial tests with wheat, the rotation adopted being (1) pasture, (2) bare fallow, (3) wheat; (*b*) cultivation tests with wheat; (*c*) manurial tests with six-rowed barley; (*d*) cultivation tests with six-rowed barley; (*e*) rate of seeding tests with wheat; (*f*) rate of seeding tests with barley.

The permanent manurial plots on this farm were laid down in 1920, hence it will be some years yet before the returns can be used as a reliable basis of comparison. However, since 1915 tests with varying dressings of superphosphates on wheat crops have been conducted on fallow land, and the mean returns secured during the eight-year period have been as follows:—No manure, 14bush. 4lbs.; ½cwt. of super, 15bush. 50lbs.; 1cwt. of super, 16bush. 49lbs.; 2cwts. of super, 17bush. 7lbs.; 3cwts. of super, 17bush. 39lbs.

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INQUIRY DEPARTMENT.

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[Replies supplied by C. A. LOXTON, B.V.Sc., Government Veterinary Surgeon.]

"W. T. T.," Wudinna, reports death of fat wethers from rupture of the bladder.

Reply—The cause of the obstruction is a calculus or stone in the urethra or tube from the bladder, by which the urine is evacuated. The trouble is most frequently seen in highly fed sheep, and is confined to rams and wethers, in which the calibre of the tube is small. The obstruction often occurs in the free portion of the penis, just behind the wormlike process, and in these cases relief can be given by amputating this portion of the organ. Where the obstruction is further up the tube nothing can be done in the way of surgical treatment.

Hon. Secretary, Agricultural Bureau, Mount Gambier, asks, Are small blood worms in horse troughs injurious to horses?

Reply—These small red worms are probably the larvae of one of the midges, which are common in stagnant water. They are of no economic importance, and are not injurious to horses. I note that this inquiry was previously replied to on May 14th. Confusion occurs from the fact that a common name such as "blood worm" is used to describe several different forms. The immature "blood worm" of horses in the form it is swallowed by the host is almost microscopic in size. These will occur in the drinking water if it is subject to contamination from the manure of horses harboring the parasite.

[Replies by F. MURRAY JONES, B.V.Sc., M.R.C.V.S., Assistant Government Veterinary Surgeon.]

"E. T.," Mount Bryan, has heifer with large swelling around the navel.

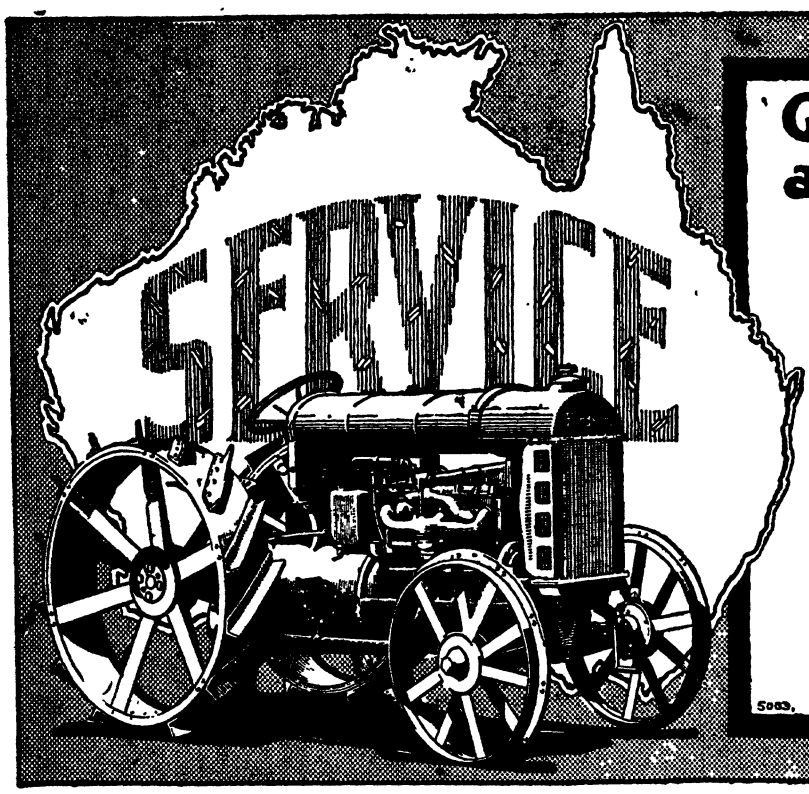
Reply—This condition will not prevent you using the milk. Give the animal as a drench the following:—Epsom salts, 8ozs.; whole ginger, 1oz.; treacle, 4ozs.; tepid water, 1 pint. Shake until the salts are dissolved, and then administer. Apply with friction a mixture consisting of equal parts of salad oil and vinegar to the swelling.

"W. H. T.," Black Springs, has foal, although well fed, is losing condition.

Reply—I would suggest you feeding the foal on ground oats, maize meal, and chaff, to which has been added a little oil cake. Feed only the best hay, and do not give any that is inclined to be mouldy or dirty. Provide green feed if possible.

Hon. Secretary, Agricultural Bureau, Yadnarie, asks—(1) What percentage of pure blood could a calf claim bred from a pure-bred bull and a mongrel cow, first, second, third, and fourth cross? (2) What percentage of pure blood would be imparted by a half pure-bred bull and a mongrel cow, first, second, third, and fourth cross? (3) Cure for horse with swollen legs.

Reply—Question No. 1: Proportion of pure blood resulting from pure-bred bull and mongrel cow:—First cross, half bred; second cross, three-quarter bred; third cross, seven-eighth bred; fourth cross, fifteen-sixteenth bred; fifth cross, thirty-one-thirty-second bred. Question No. 2: Proportion of pure blood resulting from half-bred bull and mongrel cow:—First cross, one-quarter bred; second cross, three-eighth bred; third cross, seven-sixteenth bred; fourth cross, fifteen-thirty-second



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bred; fifth cross, thirty-one-sixty-fourth bred. Question No. 3.—I should advise the administration of half a teaspoonful of powdered nux vomica given with treacle and smeared on the teeth and tongue once daily. In addition, make up the following powders:—Sulphate of iron, 6ozs.; powdered gentian, 10ozs., mixed together, and place one tablespoonful in the feed once daily.

Hon. Secretary, Agricultural Bureau, Moorook, reports mare with very tender mouth, and unable to eat long hay.

Reply—I would advise you to give her half a pint of raw linseed oil. Bathe the mouth with a solution of alum water in the strength of one teaspoonful to a pint of water. Feed her with soft and sloppy diet with a liberal amount of bran. Other feed to be damp.

"E. W. P.," Brinkley, has six-year-old gelding suffering from swelling of the hind legs.

Reply—I gather that the animal suffers from a recurrence of a condition known as "big leg," or lymphangitis. This condition usually follows on after a rest or when the animal has been liberally fed with grain. Again, some animals seem particularly prone to this ailment. Treatment consists in giving a purgative, such as an aloetic ball, together with constant cold applications to the affected limb. Sometimes this condition ends in more or less chronic thickening of the limbs.

Hon. Secretary, Agricultural Bureau, Clarendon, asks if there is any law in existence whereby an owner known to have a horse suffering from cancer can be compelled to destroy the animal.

Reply—The Stock Diseases Act of 1888 provides the Chief Inspector of Stock with full power to take whatever steps he considers necessary in the suppression of animal diseases, and cancer is one of the scheduled diseases. However, in actual practice as regards horses, the case would have to be beyond veterinary surgical treatment, before the owner would be advised to destroy.

"L. R.," Pata, has forwarded for identification balls of matted fibre taken from the bible of a sheep.

Reply—These balls or concretions are fairly common. They consist of, usually, cotton fibres or layers of vegetable matters. The mass becomes rounded as the result of the movement on the stomach walls. The black cover is the result of the digestive juices acting on the outer layer.

Hon. Secretary, Blackheath Agricultural Bureau, reports (1) that when dressing a sheep the liver was found to be attached to one side of the ribs; (2) horse, when working, discharges dirty fluid from nostrils.

Reply—(1) A liver adhering to ribs is generally due to an inflammatory condition of the liver, originating either from dietetic or bacterial causes. This condition does not affect the sheep carcass for human consumption. (2) *Re* horse, nasal discharge.—This is the result of condition known as nasal catarrh. It is generally very persistent and unpleasant. I should advise you to try the effects of steaming the head with turpentine or eucalyptus, 2ozs., which should be placed in the bottom of a nosebag, together with a handful of straw, add one pint of boiling water to this. Adjust the nosebag to suit the animal and steam for 15 minutes daily. Care is required not to impede the animal's breathing the first time the nosebag is used.

"P. J. J.," Lameroo, reports aged mare which, after being ridden for some distance, lays down and appeared to be griped. Stiff in front legs, urine tinged with blood, and has lumps between front legs.

Reply—I am inclined to think that your mare suffered from a condition known as *azoturea*, a condition due to certain changes in the blood. This ailment generally occurs only during work after the animal has been spelled. I should advise giving a purgative, such as raw linseed oil, three-quarters pint, or four-dram aloetic ball. Apply liniment of belladonna to the swelling, and give daily in a drinking bucket Epsom salts, 1 oz., saltpetre, ½oz.

DEPARTMENTAL DOINGS.

AGRICULTURE.

During the past month the Director of Agriculture (Professor Arthur J. Perkins) addressed meetings of the Agricultural Bureau at Crystal Brook and Tarlee. On July 31st the Director, in company with the members of the British Overseas Land Settlement Delegation, visited the Yorke Peninsula and Middle North agricultural areas.

The Superintendent Experimental Works (Mr. W. J. Spafford), in company with the Field Officer (Mr. S. B. Opie) and the Assistant Tobacco Expert of the Victoria Department of Agriculture (Mr. G. Marks) visited the property of Mr. P. C. Head at Woodside in connection with the proposed experiments in tobacco culture.

The Field Officer (Mr. S. B. Opie) delivered addresses to the Windsor and Pompoota Branches of the Agricultural Bureau.

HORTICULTURE.

The Horticultural Instructor (Mr. Geo. Quinn) attended a Vine Pruning Competition at Lyndoch organised by the local Branch of the Agricultural Bureau, and assisted the officials in judging the work of the competitors. Mr. Quinn also attended the Vine Pruning Match held under the auspices of the Royal Agricultural and Horticultural Society at Reynella. A pruning demonstration and address were also given by this officer to the members of the Farrell's Flat Agricultural Bureau. Five lectures and two Saturday afternoon demonstrations were given to the students of the Fruit Culture Class at the School of Mines.

POULTRY.

Mr. D. F. Laurie (Government Poultry Expert) delivered an address to the students of the Winter School for Farmers at Roseworthy Agricultural College. Mr. Laurie inspected a number of large poultry plants in the metropolitan and suburban areas, and delivered four lectures to a class of 103 students at the School of Mines.

DAIRYING.

The Government Dairy Expert (Mr. P. H. Suter) addressed the Winter School for Farmers at Roseworthy Agricultural College and the members of the Clarendon Branch of the Agricultural Bureau. Mr. Suter also attended the Conference of Upper Northern Branches of the Agricultural Bureau. The Assistant Dairy Expert (Mr. H. J. Apps) delivered addresses to the following:—Pompoota and Nunkeri and Yurgo Branches of the Agricultural Bureau, and the Winter School for Farmers at the Roseworthy Agricultural College. Dairy factories and dairymen in the Murray Bridge district were also visited by this officer.

GENERAL.

Captain S. A. White, C.M.B.O.U. (Vice-Chairman of the Advisory Board of Agriculture) delivered addresses to the Clare and Halidon Branches of the Agricultural Bureau. The Secretary of the Advisory Board of Agriculture (Mr. H. J. Finnis) attended the Annual Conference of Upper Northern Branches of the Agricultural Bureau at Morchard. Mr. F. C. Richards addressed the annual meeting of the Strathalbyn Bureau and opened a new Branch at Cobdogla.

DAIRYING AND PIG RAISING IN THE HILLS.

Owning a 100-acre farm, equipped with a 60-ton capacity silo, a farmer in the Woodside district, who desires to engage mainly in dairying and pig raising, recently sought the advice of the Department of Agriculture as to the best way to crop the holding. The recommendations of the Superintendent of Experimental Work (Mr. W. J. Spafford) were as follows:—

To be managed as a dairy farm in conjunction with pigs, very possibly best results will be obtained if practically all crops grown are utilised by feeding them to cows, and sufficient grain or grain products purchased to feed to pigs in admixture with skim-milk, butter-milk, or whey, according to which by-product is available. To do this to advantage the following order of cropping could be followed:—

20 acres Subterranean clover (first year).
20 acres Subterranean clover (second year).
20 acres cereals for hay.
20 acres summer crops for ensilage and green feed.
20 acres for house, buildings, yards, potatoes, peas, &c.

These crops could consist of:—

20 *Acres Cereals for Hay.*—6 acres Algerian oats (sown in April); 6 acres, mixture Algerian oats and Leak's Rustproof wheat (sown after the oats); 8 acres, Leak's Rustproof wheat, or an earlier variety, if for any reason the seeding was delayed.

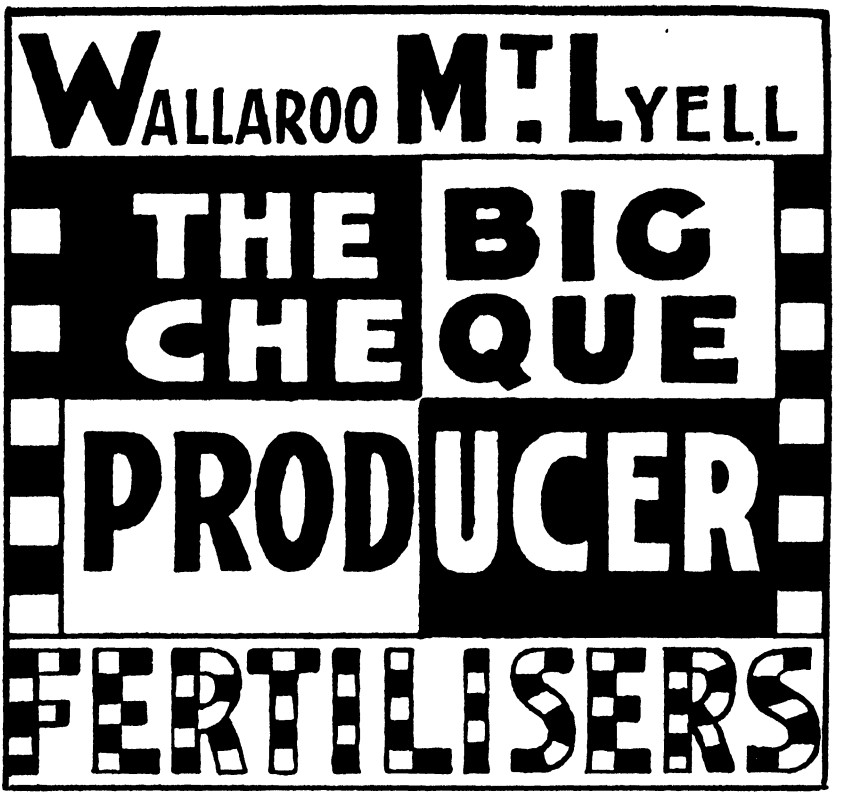
20 *Acres Summer Crops for Ensilage and Green Feed* (grown on the land which carried cereals the previous year).—7 acres sunflowers for ensilage and green feed; 7 acres maize for ensilage and green feed; 6 acres Sudan grass for green feed.

20 *Acres Subterranean Clover* (first year).—To be sown in April at latest, on the land which carried the summer crops in the previous year.

20 *Acres Subterranean Clover* (second year).—Being the second year that the clover is left for pasture, after seeding the land which carried summer crops.

If you should wish to grow some grain for livestock feeding, the order of cropping could remain the same, but barley could be grown in part of the cereal-crop fields; maize and grain sorghums could be grown for grain amongst the summer crops; and peas and other grain producers could be grown on the 20 acres set aside for potatoes and other small-area crops.

In your district liberal applications of phosphatic fertilisers are quite essential, and at least 1cwt. superphosphate should be used to the acre with every crop grown, and better results will be secured if this amount is considerably increased. For any potatoes you grow, dressings of 6cwts. to 10cwts. superphosphate per acre are not too heavy.



SECOND REPORT ON THE TURRETFIELD DEMONSTRATION FARM.

1922-33 SEASON.

[By ARTHUR J. PERKINS, Director of Agriculture.]

It will be recalled that since the 1st of July, 1921, Turretfield has been run as a Demonstration Farm, on which it is proposed to carry out, on a commercial scale, the farming practices recommended for the district. It follows that all more or less experimental work has had to give way to the requirements of a balance-sheet, corresponding to normal farming operations.

SCHEME OF FARM OPERATIONS.

The farm consists approximately of 1,262 acres of arable land and 327 acres of rough grazing land; in addition, about 15 acres are occupied by buildings, plantations, &c.

The general plan of operations has been described in detail in the first report; it may be summarised briefly as follows:—

The major portion of the arable area is run on a three-course rotation and the balance on a four-course rotation, resulting roughly in the following distribution of the land:—

	Acres.
1. Bare fallow	450
2. Hay or Wheat	450
3. Second crop (barley or oats)	200
4. Grazing crops, &c.	162
Arable area	1,262

Naturally, the actual distribution of the land in each season is dictated by circumstances, and cannot always conform absolutely to the ideal indicated above. In the 1922-23 season the distribution was as follows:—

	Acres.
1. Bare fallow	424
2. Wheat and Hay	429
3. Second crop (barley)	131
4. Grazing crops, &c.	278
Arable area	1,262

A fat lamb flock and a herd of Middle York pigs form the main type of livestock associated with these crops. The livestock have access to both the arable and the non-arable areas, and accounts concerned are debited proportionally.

The 1921-22 Season.

The 1921-22 season, which has already been reported upon in detail, closed with a net profit of £398 11s. 6d. (exclusive of estimated land tax and district council rates) for a period of nine months (July 1st, 1921, to March 31st, 1922). For the same period the sum of £800 5s. was paid into general revenue as representing charges owing for rent, interest on floating capital and portion of manager's salary, less difference between interest on current and overdraft accounts. The difference between assets and liabilities (including manager's salary and estimated land tax and district council rates, but exclusive of rent and interest), namely, £1,019 12s. 7d., was equivalent to 7.73 per cent. per annum for a period of nine months on the capital (fixed and floating) engaged by the Government on the farm, namely, £17,590 18s. 2d.

From another point of view, if the manager be looked upon as owner, after keeping himself and family in food and service, and

allowing 5 per cent. on fixed and floating capital, his net earnings over a period of nine months would have been equivalent to £500 19s. 5d.

It should be stated here that these satisfactory results are much to the credit of the very efficient management of Mr. F. E. Waddy.

1922-23 Season.

The cropping returns of the season now under consideration—1922-23—were, on the whole, somewhat disappointing, notwithstanding the fact that rainfall conditions—usually the decisive factor in such matters—were more or less normal. These are shown below in comparison with previous means:—

Table I.—*Showing* 1922 *Rainfall in Comparison with Previously Recorded Means* (14 *Years*).

	1922.		Means (14 Years).	
	In.	In.	In.	In.
January	1.42		0.53	
February	0.04		0.80	
March	0.06	1.52	1.03	2.36
April	0.77		0.82	
May	3.92		2.39	
Seeding rains		4.69		3.21
June	1.70		2.23	
July	3.62		2.00	
Winter rains		5.32		4.23
August	1.72		2.11	
September	1.07		2.41	
October	1.54		1.65	
Spring rains		4.33		6.17
November	Nil		1.17	1.17
December	2.76		0.90	
Total "useful" rain		15.86		17.14
Total rainfall	18.62		18.04	

It will be noted that "useful" rain, *i.e.*, rain falling during the growing season was slightly below normal, the main deficiency affecting spring and early summer months.

For the most part the crops made an excellent start; later on, however, towards July and August they weakened and did not recover by harvest time. Usually the bulk of Turretfield crops would be cut for hay under a balance-sheet scheme; in the present season 50 per cent.

of the crops made poor growth and were reserved for grain, whilst the balance, which was better grown, was cut for hay. This hay proved to be of exceptionally fine quality. Results will be dealt with in detail under each separate account.

The 1922-23 Balance-sheet.

Exclusive of interest on fixed and floating capital (£879 10s. 11d.), but inclusive of manager's salary and estimated rates and taxes, the difference between assets and liabilities on the 31st March, 1923, was £1,351 8s. 6d., which represents the gross earnings for the season, or 7.68 per cent. on capital engaged by the Government on the farm, against 7.73 per cent. for the nine months of the preceding season.

From another point of view, if we assume the manager to own the farm, after allowing 5 per cent on his fixed and floating capital and keeping himself and family for 12 months and meeting estimated value of rates and taxes, his net earnings would have been £657 15s.

And finally, after payment of the manager and £879 10s. 11d. towards rent and interest, the net profits earned by the farm between the 1st of April, 1922, and the 31st March, 1923, were represented by £522 14s. 7d. In this sum neither land tax nor district council rates have been allowed for; these are estimated to be represented respectively by £22 10s. 2d. and £28 6s. 10d., or £50 17s. in sum total. Hence, £471 17s. 7d. would represent net earnings to a farmer after allowing £300 per annum for himself and 5 per cent. on all capital engaged.

It should be added here that as a result of an oversight in closing last year's accounts the above figures are all too high, whilst corresponding figures for last year were to low. On March 31st, 1922, interest against capital account had not been paid into the Treasury, and by an oversight it was not shown under sundry creditors; it did not, therefore, appear on the balance-sheet. In discussing the season's results, this unpaid rent was distributed *pro rata* among the various accounts; unfortunately, 1921-22 bare fallows were overlooked at the time and did not bear their share, namely, nine months on 418 acres, or £175 18s. 2d. out of £533 17s. 9d. (nine months' rent). It follows, therefore, that the 1922-23 season took over these fallows at £175 18s. 2d. below their value and that the 1921-22 net profit suffered to that extent, whilst the 1922-23 net profit benefited by a similar amount.

The combined profits for the first 21 months (1921-23), namely, £921 6s. 1d., correctly represent the position. In future, fallows will

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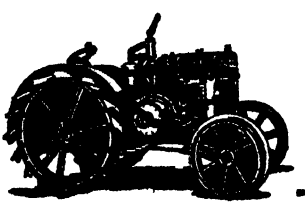
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always be taken over by the new season adequately loaded with their share of rent.

Apportionment of Rent.

The total value of rent—5 per cent. on value of land and improvements—is represented by £711 17s. This sum has to be distributed *pro rata* among the various accounts. The following distribution has been adopted for the 1922-23 season:—

	£	s.	d.
Sheep account	247	3	4
Bare fallow account	191	10	4
Hay account	95	2	4
Wheat account	86	9	8
Barley account	58	17	2
Cattle account	21	8	7
Pigs account	10	5	1
Poultry account	1	0	6
	£711	17	0

In this apportionment of rent, wheat, hay, barley, and bare fallow have each been debited with nine months' rent, which may be taken roughly to represent the mean period the land is under crop. Of these, crops sown on fallow land will automatically take up additional rent debited against fallow in the preceding season.

In the present season rent debited against horses, £53 12s. 6d., has been distributed *pro rata* amongst the accounts interested in the following ratio:—

	£	s.	d.
Bare fallow	28	9	9
Hay	8	4	5
Wheat	8	8	7
Barley	8	9	9
	£53	12	6

It is proposed in future to debit horses directly with rent and to recover the same through the enhanced value of the horse-day.

Apportionment of Taxes.

I have already indicated that land tax and district rates have been estimated respectively at £22 10s. 2d. and £28 6s. 10d. These figures have not been included in the balance-sheet, as they do not represent actual payments made by the farm. I propose, however, taking them

into consideration when discussing individual accounts. Hence, they have been distributed as follows amongst the various accounts:—

	£	s.	d.
Sheep account	17	5	5
Bare fallow account	11	6	6
Hay account	8	0	11
Wheat account	7	4	7
Barley account	4	13	4
Cattle account	1	10	7
Pigs account	0	14	3
Poultry account	0	1	5
Total	£50	17	0

Hay Account.

About 489 tons 6cwts. of hay were cut from 225.93 acres, representing a mean yield of 2 tons 3cwts. 35lbs. per acre.

On the 31st March this account showed a net profit of £576 11s. 4d., or £2 11s. an acre. If we take into consideration proportional rates and taxes—£8 0s. 11d.—this reduces the net profit to £568 10s. 5d., or £2 10s. 4d. per acre.

It has already been pointed out that in these accounts the 1921-22 fallows are not carrying their due share of rent, and as the hay crops were all sown on fallow land, it follows that the net profit indicated above is too high by an amount equivalent to nine months' rent of arable land. This sum is represented by 8s. 3d. per acre, and reduces the net profit to £2 2s. 1d. an acre.

It should be observed here that the necessity of commenting on each season's operations as soon as possible after harvesting operations have been completed, forces us to close each account whether the produce is actually sold or is still on hand. Hence, so soon as harvesting operations have been completed—in the case of hay, as soon as it is safely stacked—produce not sold in the field is transferred at a valuation to a suspense trading account, which we have called "stores account", and from which at a later date it is either sold or distributed for farm purposes. The basis of the valuation in this connection is the ruling local price at the time; and it follows that according as local prices rise or fall at a later date, so "stores account" will make a profit or a loss on harvest-time valuation. In the present instance the hay was taken over at £3 a ton; and if, as at one time seemed likely, dry conditions had extended into the winter, "stores account" would probably have made a profit on the transaction. As matters eventuated, however, we shall probably have to register a loss on next year's accounts.

I append below a detailed analysis of expenditure incurred under this account, inclusive of incidentals which must be debited against it.

1922-23 *Hay Account—Expenditure.*

	£ s. d.	£ s. d.	Per Acre. £ s. d.	£ s. d.	Per Ton. s. d.	£ s. d.
1922-23 Fallow—						
Tillage operations	105 0 9	—	0 9 3·6	—	4 3·5	—
Rent	92 15 2	—	0 8 2·5	—	3 9·5	—
		£197 15 11		£0 17 6		£0 8 1
Seeding operations—						
Tillage, ploughing £4 2 7						
Cultivating 23 4 6						
Harrowing 9 18 10						
Hand-hoeing 0 16 1						
	£38 2 0	—	£0 3 4·4	—	1 6·7	—
Drilling super., 161·13 acres £27 7 1						
Marking out 1 4 9						
Broadcasting seed 4 11 2						
	£33 3 0	—	£0 4 1·4	—	1 10·8	—
Drilling super. and seed, 64·8 acres	£18 12 3	—	£0 4 2·4	—	1 11·3	—
	£46 15 3	—	£0 4 1·7	—	1 11	—
Super	113 6 1	—	£0 10 0·3	—	4 7·6	—
Seed	98 19 3	—	£0 8 9·1	—	4 0·5	—
		£297 2 7		£1 6 3·5		£0 12 18.
Spring tillage—						
Harrowing	£2 16 4					
Rolling	2 13 7					
		£5 9 11	—	£0 0 5·8	—	0 0 2·7
Harvesting operations—						
Binding	£58 5 7	—	£0 5 1·9	—	2 4·6	—
Stooking	25 16 5	—	£0 2 2·4	—	1 0·2	—
Carting and stacking	144 16 8	—	£0 12 9·8	—	5 11	—
Binder twine	30 15 8	—	£0 2 8·7	—	1 3·1	—
		£258 14 4		£1 2 10·8		£0 10 6·9
Incidental—						
General	£119 18 1	—	0 10 7·4	—	4 11·5	—
Insurance	11 16 3	—	0 1 0·6	—	0 5·9	—
Rates and taxes	8 0 11	—	0 0 8·5	—	0 3·9	—
		£139 15 3		£0 12 4·5		£0 5 8·3
Rent	—	95 2 4	—	0 8 5	—	0 8 10·7
Totals	—	£994 0 4		£4 8 0		£2 0 7

An analysis of expenditure incurred in the growing of hay shows in the first place that it cost £994 0s. 4d. to cultivate, seed, and stack hay from 225.93 acres, yielding 2 tons 3cwts. 35lbs. to the acre. Comparison with last year's expenditure is possible only to a limited extent, since the crops sown were taken over at a valuation of 25s. an acre on July 1st, 1921. Roughly, the comparison would stand as follows:—

	Per Acre. 1922-23. £ s. d.	1921-22. £ s. d.	Per Ton. 1922-23. £ s. d.	1921-22. £ s. d.
Tillage of fallows	0 9 3.6		0 4 3.5	
Seeding operations	1 6 3.5	1 5 0	0 12 1.8	0 8 11.2
Spring tillage	0 0 5.8	Nil	0 0 2.7	Nil
Harvesting operations	1 2 10.8	1 11 3	0 10 6.9	0 11 1.8
Incidentals	0 12 4.5	0 13 2	0 5 8.3	0 4 8.5
Rent (18 months)	0 16 7,5	0 16 4	0 7 8.2	0 5 10.1
Totals	£4 8 0	£4 5 9	£2 0 7	£1 10 8

It will be noted that notwithstanding the fact that the hay yield was heavier in 1921-22, expenditure incurred both per acre and per ton was heavier in 1922-23. This may partly be explained by the fact that the crops were taken over at a valuation in July, 1921; probably these valuation figures were below actual costs of production. On the other hand, harvesting costs per ton were heavier in 1921-22, whilst incidentals were lower. Rate per ton was naturally lower in 1921-22 in view of the higher yield.

It should be added that apart from the value of the hay garnered in, the hay account has been credited with estimated value of feeding off the crop with sheep, namely, £54 7s. 7d., which reduces the net costs of growing the hay to that amount.

This account makes clear the fact that if a farmer assesses his personal efforts and oversight at £300 per annum, and pays standard wages to all those taking part in farm work, hay cannot be raised and stacked at less than 30s. to 40s. a ton, according to yields.

The analysis which follows will, perhaps, bring out more clearly the bearing of various items of expenditure and will serve as a basis of comparison for future years:—

	Labor.	Horses.	Implements	Total.	Percentage.
	£ s. d.	£ s. d.	£ s. d.	£ s. d	
Tillage of fallows	32 16 7	57 6 0	14 18 2	105 0 9	10·6
Seeding operations	25 6 9	41 12 11	17 17 7	84 17 3	8·5
Spring tillage	2 2 3	2 17 9.	0 9 11	5 9 11	0·6
Harvesting operations	119 6 7	70 19 3	37 12 2	227 18 8	22·9
Super.	—	—	—	113 6 1	11·4
Seed	—	—	—	98 19 3	10·0
Twine	—	—	—	30 15 8	3·1
General	—	—	—	119 18 1	12 0
Taxes	—	—	—	8 0 11	0·8
Insurance in field	—	—	—	11 16 3	1·2
Rent (18 months)	—	—	—	187 17 6	18·9
Totals	£179 12 2	£172 15 11	£70 18 6	£994 0 4	—
Percentage	18·1	17·4	7·1	—	100·0

Per Acre.

	Labor.	Horses.	Implements.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Tillage of fallows	0 2 10.8	0 5 1	0 1 3.8	0 9 3.6
Seeding operations	0 2 3	0 3 8.2	0 1 7	0 7 6.2
Spring tillage	0 0 2.2	0 0 3.1	0 0 0.5	0 0 5.8
Harvesting operations	0 10 6.7	0 6 3.3	0 3 4	1 0 2
Super	—	—	—	0 10 0.3
Seed	—	—	—	0 8 9.1
Twine	—	—	—	0 2 8.7
General	—	—	—	0 10 7.4
Taxes	—	—	—	0 0 8.5
Insurance in field	—	—	—	0 1 0.6
Rent (18 months)	—	—	—	0 16 7.6
Totals	£0 15 11	£0 15 4	£0 6 4	£4 8 0

	Per Ton.											
	Labor.			Horses.			Implements.			Total.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Tillage of fallows	0	1	4.1	0	2	4.1	0	0	7.3	0	4	3.5
Seeding operations	0	1	0.5	0	1	8.5	0	0	8.7	0	3	5.6
Spring tillage	0	0	1	0	0	1.4	0	0	0.2	0	0	2.6
Harvesting operations	0	4	10.5	0	2	10.8	0	1	6.4	0	9	3.8
Super.		—			—			—		0	4	7.6
Seed		—			—			—		0	4	0.5
Twine		—			—			—		0	1	3.1
General		—			—			—		0	4	10.5
Taxes		—			—			—		0	0	3.9
Insurance in field		—			—			—		0	0	5.9
Rent (18 months)		—			—			—		0	7	8.1
Totals	£0	7	4.1	£0	7	0.8	£0	2	10.6	£2	0	7

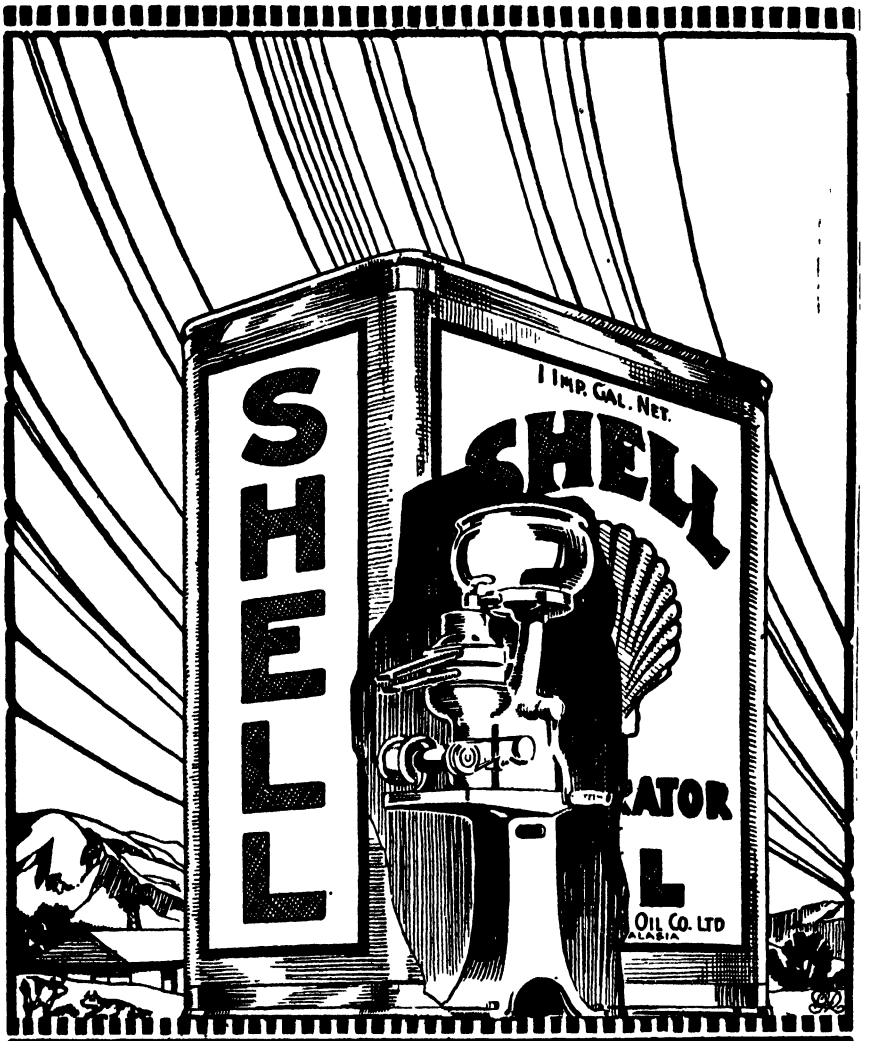
It will be seen that after making every allowance for working the land, putting in and taking off the crop, inclusive of rent for 18 months, there is still general expenditure representing incidentals and overhead charges to the extent of £139 15s. 3d. This works out to 12s. 5d. an acre, or 5s. 8d. per ton on the 1922-23 crop; or, again, 14 per cent. on the total expenditure incurred in raising and handling the crop. It seems to me that as a rule the usual estimates of cost of growing crops fail because they do not take into consideration these incidental overhead charges which are always incurred on every farm, but are rarely distributed over the revenue-earning accounts. It would seem that 15 per cent. would not be too high a figure to cover possible outlay under this heading.

It should be noted that labor enters into costs of production to the extent of 18.1 per cent. Payment has been on a mean basis of £3 4s. 7½d. a week, and the average working day has been 9½ hours. Similarly, horses have absorbed 17.4 per cent. of expenditure incurred on a cost basis of a little under 4d. an hour. Lastly, 7.1 per cent. of the expenditure is represented by wear and tear, depreciation, &c., of implements in use. These three items, therefore, are responsible for 42.6 per cent. of the cost of growing hay. Super., seed, and twine, on the other hand, account for 24.5 per cent., and rent for 18.9 per cent., the balance—14 per cent.—being general overhead charges.

The Wheat Account.

I shall repeat that those portions of the crop that appeared least promising were not cut for hay, but reserved for grain; it follows that the results do not do full justice to the district from the point of view of wheat growing.

The area harvested for grain was represented by 202.53 acres, from which 3,055bush. 37lbs. were reaped, representing 15bush. 5lbs. per acre. The account shows a profit of £16 0s. 7d., or 1s. 7d. per acre. It should be stated that, as with hay, the wheat was transferred to



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"stores account" as soon as it was safe in the barn at the ruling price at the time, namely, 4s. 9d. a bushel.

A detailed analysis of expenditure incurred under this heading is shown below:—

1922-23 *Wheat Account—Expenditure.*

	£ s. d.	£ s. d.	Per Acre. £ s. d.	£ s. d.	Per Bush. s. d.	s. d.
1921-22 fallows—						
Tillage operations	141 7 7	—	0 13 11·5	—	0 11·1	—
Rent (nine months)	83 3 0	—	0 8 2·5	—	0 6·5	—
		224 10 7 (28·6 %)		1 2 2		1 5·6
Seeding operations—						
Tillage cultivating .. £10 19 10						
Harrowing 5 11 9						
Hand-hoeing 0 16 2						
	17 7 9	—	0 1 8·6	—	0 1·8	—
Drilling super., 18·77 acres 1 13 8						
Marking out 0 12 6						
Broadcasting 1 1 8						
	3 6 11	—	0 3 6·8	—	0 2·8	—
Drilling super and seed, 183·76 acres	32 7 2	—	0 3 6·8	—	0 2·8	—
	35 14 1	—	0 3 6·8	—	0 2·8	—
Super	109 7 7	—	0 10 9·6	—	0 8·6	—
Seed	78 18 7	—	0 7 9·2	—	0 6·2	—
		241 3 0 (30·7%)		1 3 9·8		1 6·9
Spring Tillage—						
Harrowing	2 4 3					
Rolling	0 9 8					
		2 13 11 (0·3 %)	—	0 0 3·2	—	0 0·2
Harvesting Operations—						
Reaping	69 8 2	—	0 6 10·2	—	0 5·4	—
Sewing bags	5 17 11	—	0 0 6·9	—	0 0·4	—
Carting wheat to barn	11 4 2	—	0 1 1·3	—	0 0·9	—
Bags	37 10 0	—	0 3 8·4	—	0 2·9	—
Twine	1 3 4	—	0 0 1·4	—	0 0·1	—
		125 3 7 (15·9 %)		0 12 4·3		0 9·8
Incidentals—						
General	98 12 8					
Rates and taxes	7 4 7					
		105 17 3 (13·5 %)	0 10 5·4	—	0 8·3	—
Rent (nine months)	—	86 9 8 (11·0 %)	0 8 6·5	0 18 11·9	0 6·8	1 3·1
Totals	—	£785 18 0	—	£3 17 7·2	—	5 1·6

Hence, a total expenditure of £785 18s. was incurred for sowing and reaping 202.53 acres, which yielded 15bush. 5lbs. to the acre: in summary, items of expenditure have been as follows:—

	£ s. d.		Per cent.
1921-22 fallows	224 10 7	or	28.6
Seeding operations	241 3 0	or	30.7
Spring tillage	2 13 11	or	0.3
Harvesting operations	125 3 7	or	15.9
General	105 17 3	or	13.5
Rent (nine months)	86 9 8	or	11.0
	£785 18 0	or	100.0

The cost per acre (£3 17s. 7.2d.) and the cost per bushel (5s. 1.6d.) are higher than similar figures for 1921-22, namely, £3 and 4s. 6½d. respectively. They do not, however, admit of absolute comparison, because of the fact that 1921-22 crops were taken over at a valuation on 1st of July. The only figures that are comparable concern harvesting operations—12s. 4.3d. per acre in 1922-23 and 12s. 4d. in 1921-22, or 9.8d. per bushel in 1922-23 and 11.2d. in 1921-22. It should be added that these figures differ slightly from those of the profit and loss account because of the inclusion of rates and taxes, which do not figure in the profit and loss account, and because returns from feeding off of the crop have not been taken into account.

The account has been further analysed on the same lines as hay.

	Labor.	Horses.	Implements.	Total.	Percentage
	£ s. d.	£ s. d.	£ s. d.	£ s. d	
Tillage of fallows	47 15 1	75 2 7	18 9 11	141 7 7	18·0
Seeding operations	14 14 5	28 9 5	9 18 0	53 1 10	6·8
Spring tillage	1 0 1	1 7 7	0 6 3	2 13 11	0·3
Harvesting operations	30 13 4	25 0 7	30 16 4	86 10 3	11·0
Super.	—	—	—	109 7 7	13·9
Seed	—	—	—	78 13 7	10·0
Bags	—	—	—	37 10 0	4·8
Sewing twine	—	—	—	1 3 4	0·1
General	—	—	—	98 12 8	12·6
Rates and taxes	—	—	—	7 4 7	0·9
Rent (18 months)	—	—	—	169 12 8	21·6
Totals	£94 2 11	£180 0 2	£59 10 6	£785 18 0	100·0
Percentage	12·0	16·5	7·6	—	—

Per Acre.

	Labor.	Horses.	Implements.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Tillage of fallows	0 4 8.5	0 7 5	0 1 9.9	0 13 11.5
Seeding operations	0 1 5.4	0 2 9.7	0 0 11.7	0 5 2.8
Spring tillage	0 0 1.2	0 0 1.6	0 0 0.4	0 0 3.2
Harvesting operations	0 3 0.3	0 2 5.7	0 3 0.4	0 8 6.4
Super.	—	—	—	0 10 9.6
Seed	—	—	—	0 7 9.2
Bags	—	—	—	0 3 8.4
Sewing twine	—	—	—	0 0 1.4
General	—	—	—	0 9 8.9
Rates and taxes	—	—	—	0 0 8.6
Rent (18 months)	—	—	—	0 16 9
Totals	£0 9 3.5	£0 12 10	£0 5 10.3	£3 17 7

Per Bushel.

	Labor.	Horses.	Implements.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Tillage of fallows	0 0 3.7	0 0 5.9	0 0 1.5	0 0 11.1
Seeding operations	0 0 1.2	0 0 2.3	0 0 0.7	0 0 4.2
Spring tillage	—	—	—	—
Harvesting operations	0 0 2.4	0 0 2	0 0 2.4	0 0 6.8
Super.	—	—	—	0 0 8.6
Seed	—	—	—	0 0 6.2
Bags	—	—	—	0 0 2.9
Sewing twine	—	—	—	0 0 0.1
General	—	—	—	0 0 7.8
Rates and taxes	—	—	—	0 0 0.6
Rent (18 months)	—	—	—	0 1 1.3
Totals	£0 0 7.3	£0 0 10.2	£0 0 4.6	£0 5 1.6

In the matter of wheat for grain, therefore, labor absorbed 12.0 per cent., horses 16.5 per cent., and implements 7.6 per cent. of total expenditure incurred, or in sum total 36.1 per cent. as against 42.6 per cent. for hay for the same items.

Purchased articles—super. 13.9 per cent., seed 10.0 per cent., bags 4.8 per cent., sewing twine 0.1 per cent.—absorb jointly 28.8 per cent., as against 24.5 per cent. for hay.

Finally, rates and overhead charges aggregate 13.5 per cent., as against 14 per cent. for hay and rent 21.6 per cent., as against 18.9 per cent. for hay.

Barley Account.

In the winter of 1922 about 131 acres of stubble land was broken up and sown to six-row barley. At harvest time only 12bush. 37lbs. to the acre were gathered in. This is, of course, a very low average, and resulted in a loss on the account of £52 4s. 8d., or 8s. an acre, notwithstanding the fact that grain was taken over by the stores account at 2s. 7d. a bushel. The low yield is apparently attributable partly to poor growth, also to unsatisfactory harvest conditions, which led to much shaking out of the grain.

Details concerning expenditure under this account are shown herewith:—

Barley Account—Expenditure 1922-23.

	Total.	Per Acre.		Per Bush.	Per Cent		
Preparation of land—	£ s. d.	£ s. d.	£ s. d.	s. d.	s. d.		
Burning off stubble..	1 10 7	—	0 2·8	—	0 0·2	—	—
Ploughing	42 17 11	—	6 6·6	—	0 6·2	—	—
Cultivating	3 3 10	47 12 4	0 5·8	0 7 3·2	0 0·5	0 6·9	17·5
Seeding operations—							
Drilling	21 9 5	—	3 3·3	—	0 3·1	—	—
Super.	39 14 1	—	6 0·7	—	0 5·7	—	—
Seed	16 1 1	—	2 5·4	—	0 2·3	—	28·3
		77 4 7		0 11 9·5		0 11·1	
Harvesting operations—							
Reaping	31 3 3	—	—	—	0 4·4	—	—
Bags	8 0 6	—	—	—	0 1·1	—	—
Sewing twine	0 14 2	—	0 1·3	—	—	—	—
Sewing bags	3 11 9	—	0 6·5	—	0 0·6	—	—
Carting to barn	6 16 1	—	1 0·5	—	0 0·9	—	18·5
		50 5 9		0 7 8·1		0 7·0	—
Identals—							
General	33 16 11	—	5 2 0	—	0 4·8	—	—
Rates and taxes	4 13 4	—	0 8·5	—	0 0·7	—	14·1
		38 10 3		0 5 10·5		0 5·5	—
Rent (nine months) .	—	58 17 2	—	0 8 11·8	—	0 8·5	21·6
Totals.....	—	£272 10 1	—	£2 1 7	—	3 3d.	100·0

Expenditure per acre attained to £2 1s. 7d.; in which preparation of the land was responsible for 17.5 per cent., seeding operations for 28.3 per cent., harvesting operations for 18.5 per cent., incidentals for 14.1 per cent., and rent for 21.6 per cent. Owing to the low yield the cost per bushel was unavoidably high, 3s. 3d.

Last year, with a yield in excess of 19bush., the cost per acre was £2 4s. 8d., and the cost per bushel 2s. 3½d.

From a different point of view this account admits of analysis as follows:—

Analysis of Barley Expenditure.

	Labor.	Horses.	Implements.	Total	Percentage.
	£ s. d.	£ s. d.	£ s. d.	£ s. d	
Preparation of land	12 1 8	30 5 10	5 4 10	47 12 4	17·5
Seeding operations	5 0 3	12 3 5	4 5 9	21 9 5	7·9
Harvesting operations	14 15 9	14 0 7	12 14 9	41 11 1	15 2
Super.	—	—	—	39 14 1	14·6
Seed	—	—	—	16 1 1	5·9
Bags	—	—	—	8 0 6	2 9
Sewing twine	—	—	—	0 14 2	0 3
General	—	—	—	33 16 11	12·4
Rates and taxes	—	—	—	4 13 4	1·7
Rent	—	—	—	58 17 2	21 6
Totals	£31 17 8	£56 9 10	£22 5 4	£272 10 1	100 0
Percentage	11 7	20·7	8·2	—	—

Per Acre.

	Labor.	Horses.	Implements.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Preparation of land	0 1 10.1	0 4 7.5	0 0 9.6	0 7 3.2
Seeding operations	0 0 9.2	0 1 10.3	0 0 7.9	0 3 3.4
Harvesting operations	0 2 3.1	0 2 1.7	0 1 11.3	0 6 4.1
Super.	—	—	—	0 6 0.7
Seed	—	—	—	0 2 5.4
Bags	—	—	—	0 1 2.7
Sewing twine	—	—	—	0 0 1.3
General	—	—	—	0 5 2.0
Rates and taxes	—	—	—	0 0 8.5
Rent	—	—	—	0 8 11.8
Totals	£0 4 10.4	£0 8 7.5	£0 3 4.8	£2 1 7

Per Bushel.

	Labor.	Horses.	Implements.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Preparation of land	0 0 1.7	0 0 4.4	0 0 0.8	0 0 6.9
Seeding operations	0 0 0.7	0 0 1.8	0 0 0.6	0 0 3.1
Harvesting operations	0 0 2.1	0 0 2	0 0 1.8	0 0 5.9
Super.	—	—	—	0 0 5.7
Seed	—	—	—	0 0 2.3
Bags	—	—	—	0 0 1.1
Sewing twine	—	—	—	—
General	—	—	—	0 0 4.8
Rates and taxes	—	—	—	0 0 0.7
Rent	—	—	—	0 0 8.5
Totals	£0 0 4.5	£0 0 8.2	£0 0 3.2	£0 3 3

Thus, then, labor at 4s. 10.4d. per acre, horses at 8s. 7.5d., and implements at 3s. 4.8d. aggregate 16s. 10.7d., or 40.6 per cent. of total expenditure incurred in handling a second crop of barley.

Super., seed, bags, and twine—9s. 10d. per acre in the aggregate—account for 23.7 per cent. of the expenditure, incidentals for 14.1 per cent., and rent for 21.6 per cent.

Expenditure analysed on a bushel basis shows how costly is a low yielding crop in any circumstances, and how impossible it is to grow it at a profit at current prices.

Pig Account.

This account, which yielded a profit of £53 17s. 10d. last year, closed in 1922-23 with a debit balance of £304 11s. 9d. A careful analysis of the account should indicate the causes of 1922-23 losses.

Expenditure incurred may be analysed as follows in comparison with expenditure incurred in 1921-22. It should be recalled that the latter period covered nine months only:—

Pig Account Analysis of 1922-23 *Expenditure in Comparison with that of* 1921-22.

	1922-23 Expenditure.			1921-22 Expenditure.	
		Total.	Percentage.	9 Months	12 Months (calculated)
	£ s. d.	£ s. d.		£ s. d	£ s. d
Labor	—	113 15 7	19 6	82 0 0	109 6 8
Foodstuffs, &c—					
P'g meal	15 5 9				
Wheat (485bush.)	102 15 9				
Barley (1,040bush.)	148 14 0				
Oats (372bush.)	51 9 5				
Milk	19 11 11				
Aristment	5 6 10				
Water	2 4 8				
		345 8 4	59 7	216 9 9	288 13 0
Incidentals—					
Use of horses	3 4 7				
Use of implements, &c.	1 8 0				
Sundries	6 5 0				
General	95 17 9				
Rates and taxes	0 14 3				
		107 9 7	18 6	65 19 10	87 19 9
Depreciation on buildings	—	1 16 2	0·3	1 6 10	1 15 9
Rent	—	10 5 1	1·8	14 0 7	18 14 1
Totals	—	£578 14 9	100·0	£379 17 0	£506 9 8

It will be noted that relatively to 1921-22 expenditure referred to a 12 months' basis, the 1922-23 expenditure shows an increase of £72 5s. 6d., or 14.3 per cent. Chief items showing increases are "incidentals," £19 9s. 10d. or 22.2 per cent., and "foodstuffs," £56 15s. 4d. or 19.7 per cent.

In actual expenditure we note that foodstuffs (£345 8s. 4d.) account for 59.7 per cent. and labor (£113 15s. 7d.) for 19.6 per cent.

On the other hand, there has been a big decrease in the value of the herd between March 31st, 1922 (£357 17s.), and March 31st, 1923 (£193 9s.). This decrease in value is attributable partly to reduction in prices, but chiefly to reduction in numbers, particularly of marketable pigs.

Revenue, on the other hand, has been as follows in the two years:—

		1922-23. £ s. d.	1921-22 (9 Months). £ s. d.
Sale of Breeding Stock—			
5 boars	£24 14 10		
5 sows	28 14 8		
		53 9 6	94 16 6
300 market pigs		366 3 11	159 8 3
Household purchases		7 3 4	0 17 1
Service fees		2 0 0	4 5 0
Prizes		9 0 0	7 10 0
Totals		£437 16 9	£266 16 10

Revenue in 1922-23 was, therefore, £170 19s. 11d. in excess of nine months' revenue of 1922-23, or £82 1s. if we assume 12 months' revenue to correspond to £355 15s. 9d. This would represent an increase in revenue of about 23 per cent., which more than balances an increased expenditure of 14.3 per cent.; it follows that the loss under this account is connected partly with the condition of the herd at the time of valuation and partly with a general fall in prices.

W. & W., 890

Cyclone

METAL GATES AND FENCES

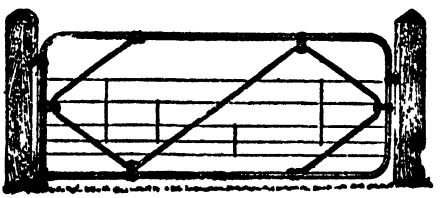


Fig. 201.—Cyclone "Z" Gate.

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Sheep Account.

After due allowance for proportion of rates and taxes, the sheep account shows a credit balance of £155 0s. 8d.

Expenditure incurred under this account may be summarised as follows:—

Sheep Account.

	£ s. d.	1922-23. £ s. d.	1921-22. £ s. d.
Labor—			
Ordinary	56 4 11		
Shearing	10 16 10		
Dipping	0 16 5		
		67 18 2	71 9 3
Feed—			
Rent of grazing areas	247 3 4		
Crop grazing	2 16 2		
Chaff, oats, and hay	9 7 3		
Water	2 6 1		
		261 12 10	150 10 5
Dip, packs, &c.	—	5 12 1	7 6 10
Incidentals—			
Use of horses	6 17 11		
Tools and plant	0 15 9		
Rates and taxes	17 5 5		
General	77 3 1		
		102 2 2	68 16 6
Purchases—			
200 ewes	216 10 9		
2 rams	8 8 0		
		224 18 9	29 18 6
Totals		£662 4 0	£328 1 6

Sales, on the other hand, were as follows:—

	£ s. d.	1922-23. £ s. d.	1921-22 (9 Months). £ s. d.
342 lambs	415 10 3		
20 rams	54 8 0		
72 ewes	56 16 4		
Household	35 7 9		
Sheepskins	8 4 4		
Prizes	7 16 6		
Wool	125 5 6		
		703 8 8	388 11 7

The differeence between sales and expenditure was, therefore, only £41 4s. 8d.; included in the latter, however, was the purchase of 200 young ewes and two rams. Hence, the value of the flock on March 31st had risen to the extent of £113 16s., and representing a general net profit of £155 0s. 8d.

The flock consisted on March 31st, 1923, of—

Rams	26
Border Leicester ewes	30
Merino ewes	198
Crossbred ewes	274
Ration sheep	34
Total	562

Stores Account.

It has already been explained that all farm produce not sold as soon as available is transferred at a valuation to this account. It follows that profits or losses are made in this account according as prices rise or fall after valuation. Similarly, produce may deteriorate in quality and even quantity during storage, both of which contingencies might lead to apparent losses.

In 1922-23 the stores account shows a credit balance of £173 19s. 3d.

Cattle Account.

Cattle occupy a position of minor importance at Turretfield. The account closed with a net profit of £22 11s. 1d., or after deduction of estimated proportion of rates and taxes, of £21 0s. 6d.

Summarised expenditure has been as follows:—

	£	s.	d.	£	s.	d.
Rent of grazing land				21	8	7
Wages				71	5	11
Use of horses and implements				2	15	8
Foodstuffs—						
Chaff	£50	2	6			
Barley	9	12	6			
Water	1	3	3			
Bran	1	6	10			
				62	5	1
Incidentals—						
General	30	17	10			
Depreciation on buildings	0	16	3			
Rates and taxes	1	10	7			
				33	4	8
				£190	19	11

Sales, on the other hand, amounted to £217 10s. 5d., consisting mostly of milk and cream.

Poultry Account.

The poultry account showed a profit balance of £41 6s. 3d. Sales amounted to £43 10s. 9d. and expenses to £2 4s. 6d.

ACCOUNTS NOT APPEARING IN THE PROFIT AND LOSS ACCOUNT.

WORKING HORSES.

The cost of various farm operations is naturally affected by the cost of the upkeep of working horses and by the number of hours that they may be at work during the course of the year.

Expenditure for 1922-23 may be summarised as follows:—

	£ s. d.	£ s. d.
Valuation of horses (1/4/22)	—	384 0 0
Foodstuffs	357 11 8	
Agistment	16 18 5	
Rent of grazing land	53 12 6	
Water	3 14 0	
Shoeing, &c.	10 3 3	
Wages	58 9 7	
Depreciation on buildings and plant	27 14 7	
Sundries	3 3 10	
		531 7 10
		915 7 10
Less valuation of horses (31/3/23)	—	413 0 0
		£502 7 10

Net cost of the horses was, therefore, £502 7s. 10d. for 12 months, during which period they supplied 27,248 hours of work. The cost per hour would, therefore, be 4.425d., or 2s. 11.4d. per eight-hour day.

I shall recall that in the present accounts, owing to the omission of charge for rent in this account, the unit used for calculating the cost of horses in farm operations was 3.927d. per working hour.

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Depreciation.

Depreciation for 1922-23 may be summarised as follows:—

	£	s.	d.
Buildings	66	9	1
Fencing	70	3	10
Water service	3	16	6
Tools and plant	219	7	1
	£359	16	6

Farm Fallows.

Expenditure on 424 acres of farm fallows to March 31st, 1923, was as follows:—

	£	s.	d.	£	s.	d.	£	s.	d.	Per Acre. £	s.	d.
Tillage operations—												
Wages	59	11	6									
Horses	167	7	8									
Implements	35	16	8									
				262	15	10	—			0	12	5
Rent	—			191	10	4						
							454	6	2	1	1	5
Drilling super. in 107 acres—												
Wages	4	6	9									
Horses	11	1	10									
Implements	2	15	1									
				18	3	8	—			0	3	5
Super	—			46	8	8						
							64	12	4	0	12	1
							£518	18	6			

Thus, then, to the 31st of March, and, therefore, on the eve of seeding, bare fallow involved an expenditure of 21s. 5d. per acre (inclusive of nine months' rental); an additional 12s. 1d. per acre was incurred on 107 acres for drilling in super. ahead of the seed.

Housekeeping Account.

Living expenses for manager and his family, also portion of the farm staff, have been met from farm revenue. Expenditure incurred under this heading has been as follows:—

	£	s.	d.
Wages	71	3	9
Provisions	92	16	10
Farm produce	87	7	7
Water	6	10	0
Kerosene and sundries	4	16	9
Firewood	5	11	8
Depreciation	47	5	7
	£315	12	2

This expenditure corresponds to 2s. 2.237d. per day, or 15s. 3.659d. per week, or £39 18s. 0.5d. per annum per individual. I think this figure points to extremely careful housekeeping.

General Account.

On any farm, and, indeed, in any business, expenditure is occasionally incurred which cannot reasonably be debited against any specific account. Such expenditure we have debited to general, and at the end of the year have distributed the sum total among the revenue-earning accounts in proportion to the expenditure incurred under each account.

This expenditure may be summarised as follows for 1922-23:—

	£	s.	d.
Wages	137	1	9
Horses	14	7	9
Tools and plant	9	13	3
Repairs to water main	22	5	4
Portion of manager's salary	185	17	5
Depreciation	75	7	8
Various	101	6	7
	£545	19	9

Usually, to these overhead charges—£545 19s. 9d.—one would need to add rates and taxes, namely, £50 17s. The new total—£596 16s. 9d.—represents about 7s. 5d. on 1,604 acres.

SUMMARY.

The salient points in this report admit of being summarised as follows:—

1. Generally speaking, the 1922-23 season at Turretfield was slightly below normal.

2. The gross earnings of the farm, exclusive of interest on fixed and floating captial, were £1.351 8s. 6d. This sum represents 7.68 per cent. on the capital engaged, namely, £17,590 18s. 2d.

3. If we assume the manager to be owner of the farm, after allowing 5 per cent. on fixed and floating capital and keeping himself and family for 12 months, the 1922-23 returns would have been equivalent to £657 15s. in the way of net earnings.

4. Finally, the net profit to the farm was represented by £522 14s. 7d. after payment of £879 10s. 11d. towards interest on fixed and floating capital and £300 towards management.

5. The combined net profits for the first 21 months aggregate £921 6s. 1d.

6. The hay yield was 2 tons 3cwts. 35lbs. to the acre.

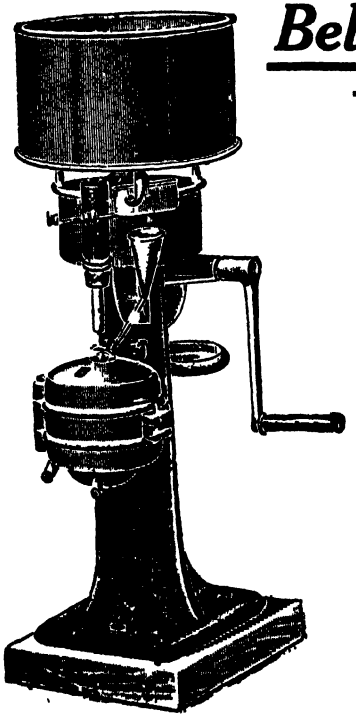
7. The net profit from 225.93 acres of hay, including estimated rates and taxes, was £475 15s. 3d., or £2 2s. 1d. an acre.

8. The inclusive cost of raising, harvesting, and stacking 2 tons 3cwts. 35lbs. of wheaten hay was represented by £4 8s. an acre, or £2 0s. 7d. a ton.

9. The cost may be summarised as follows:—

	Per Acre.			Per Ton.			Percentage.
	£	s.	d.	£	s.	d.	
Rent	0	16	7.6	0	7	8.1	18.9
Fallowing	0	9	3.6	0	4	3.5	10.6
Seeding operations	1	6	3.6	0	12	1.7	29.9
Spring tillage	0	0	5.8	0	0	2.6	0.6
Harvesting operations	1	2	10.7	0	10	6.9	26.0
General	0	12	4.5	0	5	8.3	14.0
	£4	8	0	£2	0	7	100.0

10. About 202.53 acres were reaped for wheat, yielding 15bush. 5lbs. per acre. The poorest portions of the crops were cut for grain, the balance being left for hay.



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11. The net profit on this crop was only £16 0s. 7d., or 1s. 7d. an acre, exclusive of rates and taxes.

12. The inclusive cost of growing, harvesting, and carting to the barn a 15bush. 5lb. harvest was represented by £3 17s. 7d. per acre, or 5s.1.6d. per bushel.

13. Costs may be summarised as follows:—

	Per Acre.			Per Bush.			Percentage.
	£	s.	d.	£	s.	d.	
Rent	0	16	9	0	1	1.3	21.6
Fallowing	0	13	11.5	0	0	11.1	18.0
Seeding operations	1	3	9.6	0	1	7.0	30.7
Spring tillage	0	0	3.2		—		0.3
Harvesting operations	0	12	4.2	0	0	9.8	15.9
General	0	10	5.5	0	0	8.4	13.5
	£3	17	7	£0	5	1.6	100.0

14. Six-row barley was grown as a second crop on 131 acres of the previous year's stubbles. Only 12bush. 37lbs. to the acre was reaped, mainly owing to harvesting difficulties.

15. On this crop there was a loss of 8s. an acre.

16. Costs incurred may be summarised as follows:—

	Per Acre.			Per Bush.			Percentage.
	£	s.	d.	£	s.	d.	
Rent	0	8	11.8	0	0	8.5	21.6
Preparation of land	0	7	3.2	0	0	6.9	17.5
Seeding operations	0	11	9.5	0	0	11.1	28.4
Harvesting operations	0	7	8.1	0	0	7.0	18.4
General	0	5	10.5	0	0	5.5	14.1
	£2	1	7	£0	3	3	100.0

17. The above results stress the unprofitableness of a low yielding crop.

18. The pig account, which showed a profit of £53 17s. 10d. in 1921-22, closed at a loss of £304 11s. 9d. in 1922-23.

19. The chief reason for this loss is a fall in price and reduction in numbers at the time of closing valuation.

20. Total expenditure incurred over pigs was £578 14s. 9d., which may be summarised as follows:—

	£	s.	d.
Labor	113	15	7
Foodstuffs	345	8	4
Rent	10	5	1
Sundries and general	109	5	9
	£578	14	9

21. The total receipts were £437 16s. 9d., and the difference between opening and closing valuation £164 8s.

22. After *pro rata* allowance for rates and taxes, the sheep account showed a profit of £155 0s. 8d. for 1922-23.

23. Total expenditure, apart from new purchases, amounted to £437 5s. 3d., and may be summarised as follows:—

	£	s.	d.
Labor	67	18	2
Feed, &c.	261	12	10
General and sundries	107	14	3
	£437	5	3

24. Sales aggregated £703 8s. 8d.

25. Stores account, to which is transferred all farm produce not immediately offered for sale, closed at a profit of £173 19s. 3d.

26. Cattle and poultry accounts showed profits of £22 11s. 1d. and £41 6s. 3d. respectively.

27. The cost of upkeep of working horses, inclusive of depreciation, was equivalent to 4.425d. per working hour, or nearly 3s. per eight-hour working day.

28. Depreciation on buildings, plant, &c., has been allowed for to the extent of £359 16s 6d. for 1922-23.

29. The cost of tillage operations on farm fallows to March 31st was 12s. 5d. an acre; if we add to this figure nine months' rent, it becomes 21s. 5d. an acre.

30. Drilling super. in early autumn, before seeding time, cost 3s. 5d. an acre, exclusive of cost of super.

31. Household expenditure on the farm has been at the rate of 2s. 2.237d. a day, or 15s. 3.659d. per week, or £39 18s. 0.5d. per annum per individual.

32. General expenses that could not be brought under any particular account amounted to £596 16s. 9d., or 7s. 5.3d. per acre on the whole farm. These expenses have been debited against the various revenue-earning accounts proportionally to expenditure incurred under each of them.

33. I must again congratulate the manager (Mr. F. E. Waddy) on the very satisfactory results of the balance-sheet.

TURRETFIELD DEMONSTRATION FARM

PROFIT AND LOSS ACCOUNT.

April 1st, 1922, to March 31st, 1923.

Debit.	£	s.	d.	£	s.	d.
Barley crops				52	4	8
Livestock—						
Pigs				304	11	9
Interest on floating capital, 5 per cent. on £3,353 18s. 2d.	£167	13	11			
Less difference between interest on current account and interest on overdraft	44	8	11			
				123	5	0
Net profit				522	14	7
				£1,002	16	0

Credit.	£	s.	d.	£	s.	d.
Wheat crops	16	0	7			
Hay crops	576	11	4			
				592	11	11
Livestock—						
Cattle	22	11	1			
Sheep	172	6	1			
Poultry	41	7	8			
				236	4	10
Stores account—						
Hay, grain, &c	—			173	19	3
				£1,002	16	0

July 20th, 1923

L. S. SMITH, Accountant.

TURRETFIELD DEMONSTRATION FARM.

BALANCE-SHEET AS AT MARCH 31ST, 1923.

Liabilities.	£	s.	d.	£	s.	d.
Value represented by land and improvements	14,237	0	0			
Value represented by advance for floating capital	3,353	18	2			
				17,590	18	2
Bank advance (Treasury, revenue account)		—		2,200	0	0
Sundry creditors		350	16	5		
Add interest on fixed capital		711	17	0		
Add interest on floating capital		167	13	11		
Manager's salary (proportion)		185	17	5		
		1,416	4	9		
Less difference between interest on current account and interest on overdraft		44	8	11		
				1,371	15	10
Net profits—						
Period ended March 31st, 1922		398	11	6		
Year ended March 31st, 1923		522	14	7		
				921	6	1
				£22,084	0	1

Assets.	£	s.	d.	£	s.	d.
Cash in bank (Treasury deposit account)		—		2,480	9	6
Cash in hand		—		1	17	9
Sundry debtors		—		35	13	9
Land	10,779	0	0			
Clearing	42	2	11			
Buildings and improvements	£3,481	4	3			
Less depreciation	230	19	11			
	3,250	4	4			
				14,071	7	3
Tools and plant		—		1,117	19	11
Farm produce		—		2,201	17	9
Manures		—		87	9	6
Livestock—						
Horses	413	0	0			
Cows	90	0	0			
Pigs	193	9	0			
Sheep	546	3	0			
Poultry	7	10	0			
				1,250	2	0
Fallow		—		518	18	6
Stubble		—		2	0	1
Housekeeping stores		—		35	1	1
Sundries		—		281	3	0
				£22,084	0	1

July 20th, 1923.

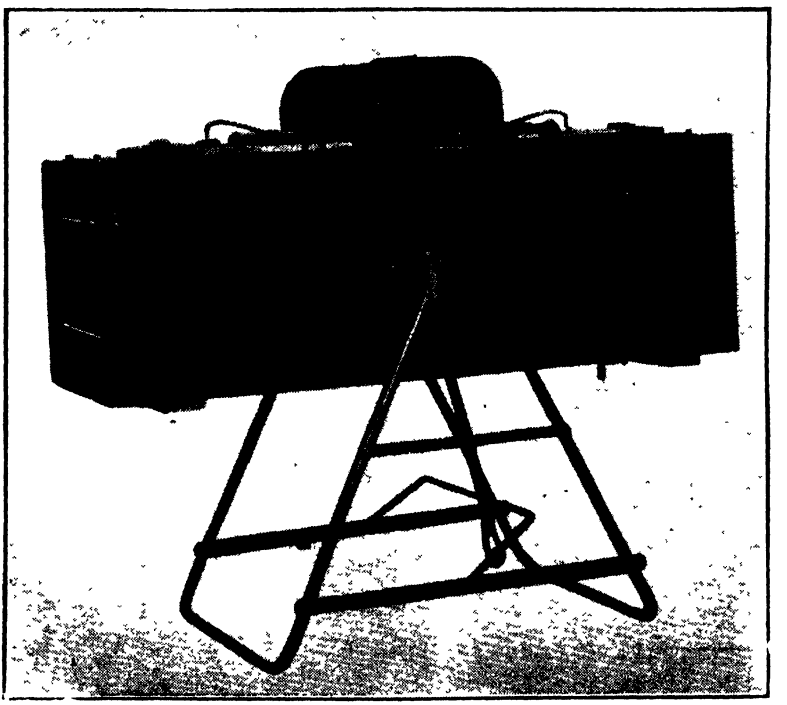
L. S. SMITH, Accountant.

AN EFFECTIVE WHEAT PICKLING MACHINE.

[By ARTHUR J. PERKINS, Director of Agriculture.]

We often hear of bunt in wheat crops, the seed of which is supposed to have been effectively pickled. Nevertheless, if the pickle has been used at the right strength, and if each wheat grain has been thoroughly "wetted" by it, apart from occasional soil re-infection, there should be little or no bunt in the crop.

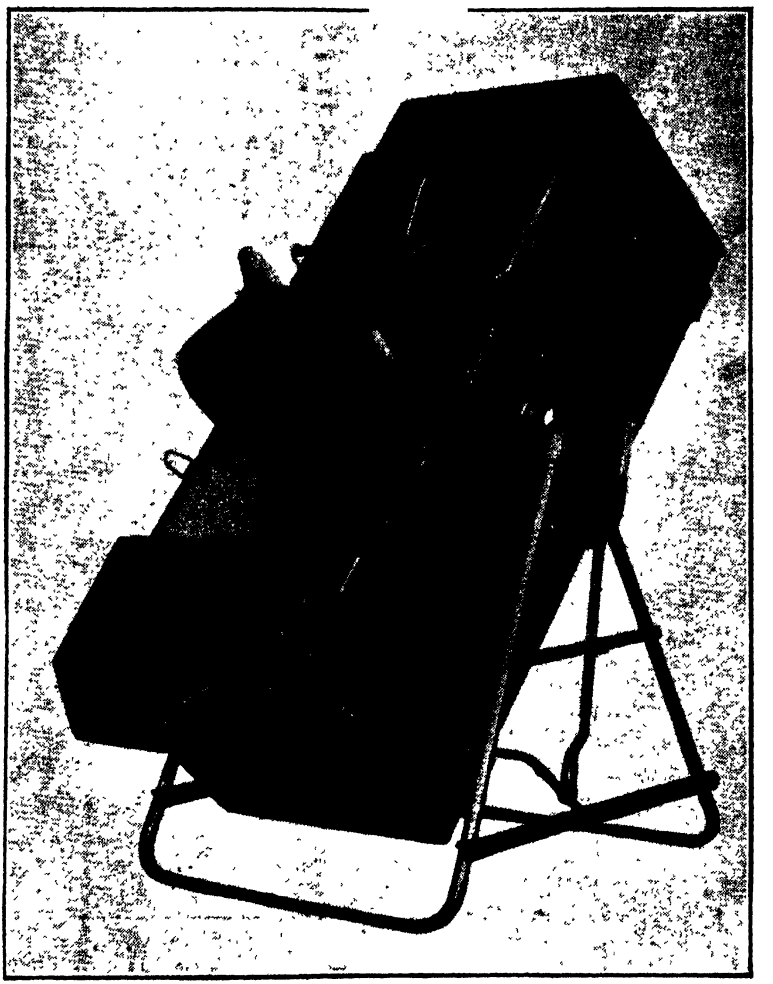
Frequently, in my opinion, lack of success in pickling is to be attributed to the way with which the pickle is applied rather than to the nature or strength of the pickle itself. Thus, merely dipping a wheat-



No. 1.

butt into a cask containing pickle, and leaving it there for a few minutes, does not in any way insure that each grain is thoroughly "wetted" by the pickle. As a matter of fact the surface of the grain is more or less greasy in character, and water seems to slip over it readily or to adhere to it loosely in the form of numerous minute air bubbles beneath which the surface remains dry. Hence, many a spore of bunt escapes contact with the pickle and lives to germinate later on in the field in contact with the grain.

It is these facts which, in my opinion, render floor pickling more effective than the various mechanical methods hitherto recommended. Unfortunately, it is a long and laborious process which we would willingly avoid if we could. Personally, for many years I have held the opinion that if floor pickling was ever to be effectively



No. 2.

superseded it would be by some form or other of a rotary pickling machine. On the suggestion of Mr. H. J. Apps, we endeavoured to use for the purpose an old rectangular butter-churn, which although quite effective from the point of view of the distribution of the pickle, was too slow for general purposes.

Quite recently, however, I have come across a new type of rotary pickler, the invention of a South-Eastern farmer—Mr. J. McGillivray—which appears to me to have solved pickling difficulties very effectively.

It consists of a long, rectangular, watertight, wooden box, divided into three compartments by two sloping brass screens, one of which is shown in illustration herewith. The box is mounted on a triangular iron frame around which it rotates freely An ingenious lever-stop arrangements enables one to place the box in the various positions indicated in the illustrations



No. 3.

The pickler is adapted to pickle one bag at a time, one half being placed in one compartment and the other in the opposite one.

When filling the pickler the box is brought to position 2, the doorway is thrown back and from 2½ to 3 gallons of 1 per cent. bluestone pickle should be poured into it. I indicate this quantity because in our experience it takes 2½ gallons of solution to floor pickle effectively one bag of wheat; a slight excess of solution will do no harm. Half a bag of wheat should then be emptied into the open compartment, and

the door closed down. The box should then be reversed and a second half bag emptied into the opposite compartment. The box should then be made to rotate slowly around its axis; a slight push will bring this about. As the box rotates the grain will be thrown violently against its sides and be brought effectively in contact with the pickle. Four or five minutes rotation should suffice for the purpose.

The box is then brought to position 3, the trap-door opened and the grain made to slide into a bag attached beneath the central lip. It is then reversed and the grain from the opposite compartment emptied out in the same way.

The whole mechanism is exceedingly simple and should, in my opinion, prove very effective for pickling wheat either with solutions of bluestone or formalin, or even with a dry powder like copper carbonate.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

THIRTY-FOURTH ANNUAL CONGRESS.

The thirty-fourth Annual Congress of the Agricultural Bureau of South Australia is to be held in the Victoria Hall, Gawler Place, Adelaide, on September 10th, 11th, and 12th.

Proceedings will be opened by His Excellency the Governor (Sir Geo. T. M. Bridges, K.C.M.G., C.B., D.S.O.), at 8 p.m., on Monday, September 10th. The Minister of Agriculture (Hon. G. F. Jenkins, M.P.) will also speak at the opening session. During the course of the Congress addresses are to be delivered by the Superintendent of Experimental Work (Mr. W. J. Spafford), on "Cultivation of the Soil"; the Wool Instructor (Mr. A. H. Codrington), "The Wool Industry"; the Assistant Dairy Expert (Mr. H. J. Apps), "Principles Underlying Dairying"; and the Experimentalist, Roseworthy Agricultural College (Mr. R. C. Scott) on "The Breeding of Fat Lambs from Merino and Half-bred Longwool-Merino Ewes."

A selection will be made from a number of papers submitted by members of Branches, and these will be included in the agenda, as will also a number of questions and resolutions which will be dealt with in "Free Parliament."

AGRICULTURAL CONFERENCE AT MORCHARD.

Branches of the Agricultural Bureau situated in the Upper Northern district of the State met in Conference at Morchard on Wednesday, July 25th. The Minister of Agriculture (Hon. G. F. Jenkins, M.P.) was present, and the Department of Agriculture was represented by the Superintendent of Experimental Work (Mr. W. J. Spafford), the Government Dairy Expert (Mr. P. H. Suter), the Wool Instructor, School of Mines, (Mr. A. H. Codrington), and the Secretary Advisory Board of Agriculture (Mr. H. J. Finnis). Mr. N. S. Lillecrapp (Morchard) occupied the chair, and approximately 100 delegates representing the Branches situated in the Upper Northern area were present. The chairman extended a cordial welcome to the visiting officers and delegates, and trusted they would gain much information that would be useful in carrying out their farming operations. The Minister of Agriculture (Hon. G. F. Jenkins, M.P.), in the course of the opening address, eulogised the work that the Agricultural Bureau was doing for the man on the land. That institution, he said, had served a very useful purpose in the development of South Australia. The men on the land could come together and discuss the various difficulties with which they met, and they could also get into touch with the various officers of the Department of Agriculture through the Agricultural Bureau. He had noticed the absence of stock, and sheep particularly, in the northern district With the possibility of lower prices for wheat he thought it would be well for them to turn their attention to other commodities, and especially to livestock. If they wanted to carry more stock they would have to turn their attention to hand-feeding on their farms. He was of the opinion that oats and barley could be more profitably sold as mutton than as cereals. Also, if they could tide over that period of two or three months when feed was scarce, they would be able to carry a greater number of stock and breeding ewes throughout the year. He thought that the hand-feeding of stock was a matter to which they should apply themselves in a practical way.

Crop Competitions.

The Department of Agriculture was very desirous that crop competitions should be undertaken in South Australia. Their success would depend upon the enthusiasm with which they were taken up in the different districts. He thought the districts should take the matter up and form strong committees. The Bureaus could associate themselves with local Agricultural Societies. No good would result if the competitions were forced upon them. He had much pleasure in declaring the Conference open, and trusted much good would result from their deliberations.

Mr. A. L. Hughes (Willowie) then contributed a paper entitled "Mistakes of Overstocking," which was followed by a paper by Mr. H. Duhring (Wilmington) on "Cancer in Sheep and Cattle."

AFTERNOON AND EVENING SESSIONS.

Mr. J. Scriven (Morchard) opened the afternoon session by giving a demonstration of the handling of horses. This was followed by an address by Mr. A. H. Codrington (Wool Instructor, School of Mines), on "Sheep and Wool Classing," in the course of which he dealt with the most profitable and practical lines for farmers to adopt.

The evening session was commenced by a "Free Parliament." Mr. J. Scriven (Morchard) moved—"That the Advisory Board be asked to approach the Railways Commissioner with reference to the delay in the carriage of stock on the railways." Mr. R. Brown seconded the motion, which was carried.

Mr. J. F. Robertson moved—"That the Stock Department be asked to supply a report on the possibility of the transmission of cancer from animals or human beings." The motion was carried.

A paper entitled—"Combined Drill and Cultivator or Separate Implements" was contributed by Mr. H. Toop (Morchard), after which which Mr. F. J. B. Scriven (Morchard) read a paper, entitled, "Superphosphate and some of its advantages," which was followed by a good discussion.

It was decided that the next Conference be held at Willowie.

IMPORTS AND EXPORTS OF FRUIT, PLANTS, ETC., JUNE, 1923.

IMPORTS.

Interstate.

Apples (bushels)	14,549
Bananas (bushels)	12,535
Lemons (bushels)	1
Oranges (bushels)	4
Passion fruit (bushels)	360
Pears (bushels)	10
Pineapples (bushels)	683
Tomatoes (bushels)	12
Peanuts (packages)	2
Beans (bushels)	3
Onions (bags)	1,232
Potatoes (bags)	23,194
Bulbs (packages)	10
Plants (packages)	43
Seeds (packages)	35
Trees (packages)	28
Wine casks, empty (number)	2,463

Fumigated—5 wine casks, 2 packages plants, 9 packages trees.

Rejected—3 bushels tomatoes, 3 bushels pineapples, 1 package plants, and 116 bags potatoes (picked over).

Overseas.

Federal Quarantine Act.

Five thousand and twenty-one packages seeds, &c.

EXPORTS.

Federal Commerce Act.

Four thousand one hundred and forty-seven packages citrus fruit, 136 packages other fresh fruit, 30,025 packages dried fruit, 200 packages preserved fruit, 12 packages jam, 7 packages honey, and 25 packages plants were exported to overseas markets. These were consigned as follows:—

London.

Dried fruit (packages)	26,530
Citrus fruit (packages)	2,104
Jam (packages)	12

New Zealand.

Dried fruit (packages)	1,946
Citrus fruit (packages)	2,043
Plants (packages)	23

Germany.

Dried fruit (packages)	2
Honey (packages)	4

India and East.

Dried fruit (packages)	381
Plants (packages)	2
Apples (packages)	130
Oranges (packages)	6
Honey (packages)	3
Preserved fruit (packages)	200

South Africa.

Dried fruit (packages)	1,165

San Francisco.

Dried fruit (packages)	1

RIVER MURRAY HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JUNE, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during June.	Per Cow during June.	Per Cow October to June.	Per Herd during June.	Per Cow during June.	Per Cow October to June.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1/C	31·37	23·83	20964·5	668·30	6621·32	824·71	26·29	266·66
1/E	23	20·97	11689	508·22	5157·18	524·82	22·82	227·08
1/J	20·40	19 20	9779	479·36	4657·76	491·69	24·10	213·18
1/L	16 70	11·90	7831	468·92	4997·61	367·30	21·99	229·84
1/M	23	20·93	9322	405·30	4603·90	483·30	21·01	229·25
1/R	13·37	11·10	6790·5	507·90	4410·48	354·85	26·54	222·05
1/T	12·80	10·60	5658	442·03	4773·57	293·90	22·96	240·08
1/U	18	17	11400	633·33	5819·04	511·57	28·42	250·81
1/W	19·53	18·63	10536	539·48	5572·29	403·40	20·66	210·27
1/X	19·07	16·37	7423	389·25	4921·04	332·30	17·43	221·71
1/Y	25·90	22·37	14974·5	578·17	5583·81	ɔ56·60	25·35	241·55
1/Z	17	11·57	7289	428·76	4520·81	316·28	18·60	204·32
1/Aa*	6·23	6·23	3025·5	485·63	5660·29	142·36	22·85	247·39
1/Bb*	7·87	7·17	3504·5	445·30	4470·45	158·47	20·14	195·66
1/Cc†	15·60	11·67	6633·5	425·22	2916·15	305·79	19·60	125·34
1/V‡	15	15	7665	511·00	2994·18	369·68	24·65	132·48
Means	17·80	15·28	9030·31	507·25	5248·80	408·56	22·95	231·72

* Entered in November, 1922. † Entered in December, 1922. ‡ Entered in February, 1923.

COWS YIELDING 1,000GALLS. OF MILK OR 400LBS. OF BUTTERFAT DURING A LACTATION PERIOD.

Name of Cow.	Owner.	No. of Days.	Milk.	Butterfat.
			Gallons.	Lbs.
Lorna	C. J. Morris, Monteith	319	1317·80	512·97
Manx	C. J. Morris, Monteith	292	1037·70	375·37
Yankee	C. J. Morris, Monteith	319	986·50	514·90
Nancy	C. J. Morris, Monteith	311	1229·20	434·01
Tiny	C. J. Morris, Monteith	319	1002·40	465·33
Dot	H. H. Clark, Mypolonga	319	817·85	433·96
Pansy	H H. Clark, Mypolonga	319	840·60	449·15

MT. GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JUNE, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during June.	Per Cow during June.	Per Cow August to June.	Per Herd during June.	Per Cow during June.	Per Cow August to June.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
2/A	20·53	6·37	1219·5	59·40	4678·66	61·10	2·98	201·81
2/B	7	4	2700	385·71	8124·07	107·79	15·40	339·23
2/C	19	14 67	6236·5	328·24	5950·03	238·98	12·58	240·15
2/D	13	8·90	3089	237·6½	4532·05	118 67	9 13	181·14
2/E	11	7·67	2690	244·55	6172·77	115·73	10·52	273·80
2/F	20	12·63	6135	306·75	5223·54	237·20	11·86	212·75
2/G	2·93	0·5	240	81·91	7511·24	10·11	3·45	342·43
2/H	25·20	8·27	3142	124·68	4940·30	134·78	5·35	207·48
2/I	12	4·47	1547·5	128·96	5270·53	64·19	5·35	217·66
2/J	11	5·23	1427 5	129·77	7139·10	77·70	7·06	307·28
2/K	21	14·53	2682 5	127·74	5941·27	159·57	7.60	253·69
2/L	31	16·63	4195	135·32	4379·93	207·56	6·70	200·51
2/N	12	Nil	Nil	Nil	3719 85	Nil	Nil	150 90
2/O	40·63	21·30	8821	217·11	3886 05	333·83	8·22	159·37
2/Q	33	9·23	4308·5	130·56	4378·49	161·47	4·89	179·84
2/R	15·10	11·73	6930	458·94	8297·21	302·10	20 01	364·44
Means	18·40	9·13	3460·25	188·06	5211·26	145·67	7·92	219 53

COWS YIELDING 1,000GALLS. OF MILK OR 400LBS. OF BUTTERFAT DURING A LACTATION PERIOD.

Name of Cow.	Owner.	No. of Days.	Milk.	Butterfat.
			Gallons.	Lbs.
Myra	E. W. Tollner, Mount Gambier ..	277	949·65	413·13
Willis	K. McIntosh, Mount Gambier ...	319	891·45	464·27
Slitter.....	E. W. Tollner, Mount Gambier ..	310	1056·30	423·00

ORCHARD NOTES FOR SOUTHERN DISTRICTS FOR AUGUST, 1923.

[By C. H. BEAUMONT, Inspector and Instructor.]

Pruning should be nearly if not quite finished. Remember, if you make any big cuts, to apply a coat of thick paint, after having trimmed the bark with a sharp knife Before you put away the pruning tools see that they are thoroughly clean, especially the saw. Rub them over with a little blacklead and they will not rust.

If the first ploughing is completed, which it should have been had the weather been favorable, clean the plough and get it ready for the spring work.

Those who have strawberry beds should be busy getting them worked up and free from weeds and runners. Where wilting has occurred, the whole bed should be dug out and burned on the spot; the land must not be replanted for a few years. If any sign of mildew is noticed use lime sulphur spray 1½ gallons in 100 gallons of fresh water. Keep the soil well worked and use lime in the ironstone soils. Watch the peach trees for aphis; they cannot be prevented but must be killed as soon as they appear. Resin wash and black leaf 40 are the best sprays to use. Woolly aphis on the apple trees will show up if the weather is suitable for its development. It should receive immediate attention.

Red spider eggs may be sterilised by using red spraying oil. Plums need extra care for this pest. If you have to spray, do it thoroughly. The eggs will be found under the bud scales and about all rough bark and joints and limbs If you have very little of the pest use a paint brush instead of a pump.

Do not leave any bandages on the apple and pear trees, or any loose bark, or have any rubbish about the trees; clear it all up and burn it and thus save trouble with codlin moth.

If you have had a severe visitation of fungous pests, spray during this month with a solution of bluestone 1lb. in 8 gallons of water, or use winter strength Bordeaux. Vines must be attended to for black spot or scab; remove loose bark, and burn it and swab with a solution of 9 gallons of water with 1 gallon of commercial sulphuric acid; care must be taken when adding the acid to the water as it becomes very hot. A good swab may be made of wattle stick and a bit of woolly sheepskin.

Have your land ready for planting citrus trees and have them ordered in good time; when ordering insist that the trees be fumigated before being sent on. Have all spraying plant in thorough going order for spring work.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, July 11th, there being present the Minister of Agriculture (Hon. G. F. Jenkins, M.P., President), Captain S. A. White (Vice-Chairman), Mr. W. J. Colebatch, B.Sc., M.R.C.V.S. (Principal Roseworthy Agricultural College), Professor Arthur J Perkins (Director of Agriculture), Messrs. C. J. Tuckwell, A. W. Sandford, Colonel Rowell, F. Coleman, H. Wicks, and the Secretary of the Advisory Board (Mr. H. J. Finnis).

Veterinary Surgeons for Country Districts.—The recent Conference of River Murray Branches carried the following resolution—"That this Conference affirms the desirability of stationing veterinary surgeons in the country districts." The matter was forwarded to the Minister of Agriculture, who stated that he could not agree to the resolution.

Travelling Instructors for River Murray Districts.—The Conference of River Murray Branches of the Agricultural Bureau resolved—"That the Government be asked to appoint a travelling citriculturist and viticulturist for the Murray districts, and that the Government be asked to appoint an instructor to soldier settlers." The Board decided to forward the resolution to the Minister with a recommendation that an instructor, competent to advise on all branches of horticulture under irrigation, should be appointed.

Parasite of Woolly Aphis.—A communication was received from the Cherry Gardens Branch requesting information concerning the woolly aphis parasite, *Aphelimus mali*, and, if practicable, asking the Department to secure a number of these parasites for distribution among woolly aphis-infested orchards. On the motion of Mr. H. Wicks, seconded by Captain S. A. White, it was decided to ask the Horticultural Instructor (Mr. George Quinn) to report on the matter.

Registration of Bulls.—The Blyth Branch resolved—"That this meeting of the Agricultural Bureau is in favor of the raising of the registration fee to £1 1s. on all but pedigreed bulls, which should be exempt, and that the tax on other than pure-bred cattle be raised from year to year." The Secretary was instructed to suggest to the Branch that the matter might be brought before the Annual Congress.

The Ex-Chief Inspector of Stock.—The retirement from the Government Service of Mr. T. H. Williams (Chief Inspector of Stock) was referred to by the Chairman and other members. Messrs. C. J. Tuckwell, F. Coleman, H. Wicks, Colonel Rowell, and Captain White eulogised the service Mr. Williams had rendered to the State, and referred to the assistance he had been to the Advisory Board. It was decided to suggest that Mr. Williams should be appointed a life member of the Board in recognition of his services.

New Branches.—Approval was given for the formation of Branches of the Agricultural Bureau at Wepowie and Kalangadoo (Women's),

with the following foundation members:—Wepowie—Messrs. W. J. Smith, C. H. Kanuerhouse, W. G. Gregenke, J. F. Burns, G. D. McLellan, L. R. Jasper, J. R. Crocker, Th. F. Orrock, J. P. McMartin.

Kalangadoo (*Women's*).—Mesdames M. McDonald, G. L. Dean, P. Lancaster, D. W. Tucker, G. Bennett; R. G. Messenger, C. Campbell, M. Evans, and C. Bailey, Misses E. Hemmings, G. Hewitt, A. Tucker, M. Lancaster, M. Bennett, and M. McCorquindale.

Branch to be Closed.—It was decided to close the Leighton Branch.

New Members.—The following names were added to the rolls of existing Branches:—Currency Creek—C. J. Coles, H. K. Scott; Coonalpyn—R. S. Ekers; Kalangadoo—B. Altschwager, C. Bailey, L. R. Davies, D. Ellison, W. Boyce, T. Ricketts; Winkie—G. W. Burden, H. H. Andrews, C. Thompson; Saddleworth—J. Kirkbright, Geo. Winkler, J. L. Hortin; Eurelia—J. R. Hall; Tantanoola—R. Campbell; Allandale East—E. Smith, Leo. E. Carlin, G. E. Wallace, F. J. Wallace; Farrell's Flat—J. Pryzibilla, A. Pryzibilla, C. Humphris, J. White, J. Kean, W. Cooper, C. Evans, C. Klem, G. Klem; Port Elliot—E. A. Tusmore; Murray Bridge—J. A. Kutzer; Wilkawatt—H. J. Billing, W. J. Street; Rockwood—H. T. Stacey, A. H. Wilkins; Marama—J. S. Churches, jun.; Morphett Vale—E. C. Christie, F. Grohs, — Taylor, D. Anderson; Parilla Well—J. Burford, F. A. Hill, N. K. Inglis; Pata—W. C. Priest, H. A. Luce; Roberts and Verran—A. J. Crooks, D. Jonas, G. Smith; Talia—E. Taylor, C. Wheaton, G North; Block E—F. H. Colby; Hookina—F. L. Lindblom; Carrow—J. Gibbons, W. G. Cowley, A. Freeman, S. J. Elliott, C. Bates, M. Bawden, L. Freeman, J. H. Harrowfield, C. J. Seebohm; Yeelanna—R. Roediger; Goode—E. M. Morcombe, L. Dacre, W. Dacre; Blackheath—B. Strauss; Balhannah—G. R. Cowell; Shoal Bay—Chas. Hall; Redhill—C. R. Coleman; Moonta—R. Retallick, C. Cook; Pinnaroo—A. Bennett.

BUDDING CITRUS.

The simplest way to change common orange trees to navels is to cut them back to the main limbs, leaving, say, 9in. of such limb above the main stem, and work into the young sprouts quite low down where they emerge from older wood. If the old trees were cut back in August or September, advises the Horticultural Instructor (Mr. Geo. Quinn), whose opinion was sought by a grower at Teal Flat, the young sprouts should be large enough to bud during the following summer. The buds are left dormant until the following spring by not removing the portion of the young sprout above them. Such pollarded citrus stocks should be heavily coated with whitewash before the summer arrives, and if a pad of grass or straw be tied around the main stems as well, the danger of sun scalding the bark will be more fully averted. Buds should be taken from navels known to bear good crops of smooth hard fruits not large in size. We advise removing the twisted wires now encircling the trunks.

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THE AGRICULTURAL OUTLOOK.

REPORTS FOR THE MONTH OF JULY.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective managers:—

Booborowie.—Weather—336 points of rain was registered up to the 28th, this fell on 16 days. Crops—The early sown wheat crops are now making very good growth, and with a reasonably wet spring some good crops should be harvested. Natural feed is growing well. Stock—Livestock, in most cases, are in good condition, excepting those roaming the roads. Pests—Rabbits are becoming very scarce in this district except in one or two isolated cases. Miscellaneous—Farmers are now busily engaged in seeding operations.

Eyre Peninsula.—Weather—Splendid rains, but weather rather cold. Crops—All looking well and prospects of the season are exceptionally good up to date. Oats are showing up exceptionally well. Natural feed making good growth. Stock—All in splendid condition and free from disease. Miscellaneous—Pruning and fallowing are completed.

Turretfield.—Weather—With the exception of two days, this month has consisted of rainy and damp days, rain having been registered on 20 days, and, following a wet May and June, the seeding season has been the worst ever experienced. Crops are very poor; a large area of fallow will not be sown; that which has been sown has in many instances perished before it germinated. Natural feed is very backward, the continuous rain checking all growth. Stock are feeling the effect of the wet weather and will not pick up until fine weather causes the feed to come on. Miscellaneous—Very little fallowing has been done, as it is only on high land that teams can work, and then only a day now and again.

Kybybolite.—Weather has continued wet and cold, until the last week, when we had some nice warm days. Three hundred and seventy-eight points were registered during the month on 22 days. Rain has been recorded on 65 days since the 5th of May, and consequently the three months have been the wettest on our records, except for the same months during 1906. We received ¼in. more than the average for July, and for the year we have had 2in. in excess of average. Crops are very backward and made very little growth during the month, except on one or two fields, the soils of which contain a large amount of organic matter. Soil conditions are too wet for preparing for pea and barley crops. Natural feed is short, and has made very little growth. It is most noticeable that plots and fields that have received fair applications of phosphate have produced better feed during the wet period. Stock are in a very fair condition, but have needed a large amount of attention and protection from cold and wet. Milk cows have not yielded as well as usual on account of absence of good green feed.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, reported on August 1st, 1923:—

BUTTER.—During the month supplies of dairy products have recorded a substantial increase, and as all consignments came along in excellent condition, buyers, both locally and interstate, were encouraged to operate freely for all grades submitted. Values remain practically stationary, only a fluctuation of ½d. per lb. occurring with top grades. Choicest factory and creamery fresh butter in bulk, 1s. 9½d.; second grades, 1s. 5d.; best separators and dairies, 1s. 7d. to 1s. 8½d.; fair quality, 1s. 5d. to 1s. 6½d.; store and collectors', 1s. 2d. to 1s. 5d.

EGGS.—The boisterous weather which prevailed for the majority of the month was responsible for a big decrease in supplies coming to our market, and a reaction in values took place, the market advancing to the extent of 2d. per dozen. Values at the close of the month were fresh hen 1s. 4d., duck 1s. 5d. per dozen.

CHEESE.—Although quantities at the beginning of the month were equal to this State's requirements, rates fluctuated owing to supplies being short in the Eastern States. Fair sized consignments of newly made cheese are coming to hand which are being absorbed readily by local buyers, whilst matured are scarce, the range at present being from 1s. 1½d. to 1s. 2½d. for large to loaf.

HONEY.—Market has been well supplied with all grades, which have been selling fairly freely to interstate buyers, prices being, prime clear extracted liquid samples, 4d. to 4½d.; best candied lots. 3½d.; whilst lower grades have been somewhat neglected at down to 2d. per lb. Beeswax is readily saleable at 1s. 4d. for the best samples.

ALMONDS.—The demand has remained good, and the consignments arriving have been equal to trade requirements, with only slight fluctuations occurring in values. Brandis, 9d. to 9½d; mixed softshells, 8d. to 8½d.; hardshells, 4½d. to 4½d.; kernels, 1s. 3½d. to 1s. 4d.; walnuts, 11d.

BACON.—Although one or two of the Eastern States have experienced difficulty in supplying this article, the curers in this State have been able to purchase their required number of pigs, and have kept the market stocked at unchanged values. Best factory-cured sides, 13½d.; hams, 1s. 3½d. to 1s. 4d.; middles, 1s. 4d.; rolls, 1s. 1½d.; lard, Hutton's in packets, 11d.; in bulk, 10d.

LIVE POULTRY.—During the course of the month consignors at various times experienced difficulty in forwarding their surplus birds owing to the rough weather, and supplies, although fairly large, were by no means equal to our buyers requirements. Several poulterers have exhausted their stocks of cold stored birds, and are buying freely, so that excellent sales have been secured for all forwardings. We expect that these good prices will be obtainable for some time to come, and we recommend farmers to consign their surplus poultry. Crates obtainable on application:—Prime roosters, 5s. to 6s. 7d. each; nice condition cockerels, 3s. 6d. to 4s. 9d. each; poor condition cockerels, 2s. 5d. to 2s. 10d. each; plump hens, 4s. to 5s. 6d. each; medium hens, 2s. 9d. to 3s. 9d. each; some pens of weedy sorts lower; geese, 6s. 6d. to 8s.; ducks, good condition, 4s. 6d. to 6s. 3d.; ducks, fair condition, 3s. to 4s. each; turkeys, good to prime condition, 1s. to 1s. 6d. per lb. live weight; turkeys, fair condition, 9½d. to 11½d. per lb. live weight; turkeys, fattening sorts, lower; pigeons, 11d. each.

POTATOES.—During the latter part of the month, values have advanced rather rapidly, the wet weather interfering with deliveries from Victoria. At the close of the month Victorian potatoes sold at from 17s. to 18s. per cwt. on trucks, Mile End; parcels a shade lower.

ONIONS.—Rates have advanced slightly. Best dry Victorians selling at 8s. per cwt. on trucks.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month of and to the end of July, 1923, also the average precipitation to the end of July, and the average annual rainfall.

Station.	For July, 1923.	To end July, 1923.	Av'ge. to end July.	Av'ge. Annual Rainfall
Far North and Upper North.				
Oodnadatta	—	1·92	3·41	4 93
Marree	0·76	3·50	3·63	6·14
Farina	0·36	5·04	4·17	6·73
Copley	0·71	5·23	5·18	8·50
Beltana	0·83	5·43	5·44	9·65
Blinman	2·93	7·01	7·69	12·61
Tarcoola	0·18	2·00	4·47	7·91
Hookina	1·71	6·57	8·00	13·60
Hawker	2·76	8·64	7·56	12·93
Wilson	2·32	6·91	7·46	12·56
Gordon	1·72	4·61	6·77	11·60
Quorn	3·84	8·31	8·13	14 24
Port Augusta	1·37	4·50	5·69	9·68
Port Augusta West	1·37	4·31	5·52	9·74
Bruce	1·53	4·73	6·09	10·76
Hammond	1·76	7·63.	6·75	11·90
Wilmington	5·00	11·66	10·59	18·44
Willowie	2 38	7·36	7·17	12·44
Melrose	6·32	17·35	12·86	23·88
Booleroo Centre	3·42	11·16	8·87	15·67
Port Germein	2·72	7 37	7·43	12·93
Wirrabara	4·86	12·79	11·31	19·85
Appila	2·47	9·33	8·39	15·01
Cradock	1·78	6·26	6·68	11·50
Carrieton	2·51	8·48	7·28	12 91
Johnburg	2·08	5·61	5·96	10·85
Eurelia	2·88	7·96	7·63	13·56
Orroroo	2·36	7·05	7·99	13·75
Nackara	1·58	4·85	7·20	11·85
Black Rock	2·76	9·34	7·27	12·73
Ucolta	1·56	4·80	6·92	12·10
Peterborough	2·53	8·55	7·53	13·53
Yongala	1·33	8·44	7·93	14·51
Lower North-East.				
Yunta	0·94	3·22	5·11	8·93
Waukaringa	0·72	4·04	5·17	8·61
Mannahill	0·86	3·18	5·03	8·79
Cookburn	0·78	3·84	4·93	8·42
Broken Hill,N.S.W.	1·24	6·11	5·86	10·08
Lower North.				
Port Pirie	2·12	6·80	7·95	13 55
Port Broughton	2·95	8·26	8·47	14·27
Bute	3·35	11·07	9·26	15·80
Laura	3·74	12·24	10·22	18·25
Caltowie	4·10	11·25	9·33	17·19
Jamestown	3·85	11·95	9·71	17·86
Bundaleer W. Wks.	3·52	11·43	9·62	18·05
Gladstone	4·00	13·61	5·95	16·22
Crystal Brook	3·54	9·17	9·05	15·93
Georgetown	4·07	13·66	10·43	18·50.
Narridy	2·05	9·93	10·35	16·43
Redhill	2·84	9·78	10·87	16·93

Station.	For July, 1923.	To end July, 1923.	Av'ge. to end July.	Av'ge. Annual Rainfall
Lower North—*continued.*				
Spalding	3·41	8·71	10·78	20·41
Gulnare	3·67	11·16	10·46	19·34
Yacka	3·24	8·94	8·66	15·45
Koolunga	3·02	8·79	9·01	15·87
Snowtown	2·52	9·09	9·22	16·05
Brinkworth	3·08	9·71	8·98	16·26
Blyth	3·45	10·48	9·62	16·96
Clare	5·82	17·12	14·17	24·60
Mintaro	5·80	18·06	12·96	23·40
Watervale	6·29	17·46	15·74	27·44
Auburn	5·17	14·48	13·96	24·30
Hoyleton	3·80	9·50	10·12	17·85
Balaklava	2·86	8·43	9·16	15·91
Port Wakefield	1·93	7·91	8·08	13·29
Terowie	2·03	6·65	7·45	13·78
Yarcowie	1·73	6·17	7·91	14·18
Hallett	3·36	9·63	8·90	16·47
Mount Bryan	3·96	11·98	9·02	16·74
Kooringa	3·75	10·94	10·27	18·06
Farrell's Flat	3·89	11·84	10·67	18·97
West of Murray Range.				
Manoora	4·40	13·09	10·20	18·78
Saddleworth	3·86	13·58	11·26	19·74
Marrabel	4·86	15·81	11·02	19·67
Riverton	4·95	15·81	11·81	20·71
Tarlee	3·87	15·91	10·03	17·81
Stockport	3·45	15·45	9·20	16·49
Hamley Bridge	3·88	14·70	9·40	16·52
Kapunda	3·83	15·03	11·33	19·80
Freeling	3·37	15·39	10·10	17·90
Greenock	4·24	18·06	11·01	21·60
Truro	4·07	16·51	11·31	20·80
Stockwell	4·02	17·38	11·45	20·31
Nuriootpa	3·74	16·00	11·88	20·99
Angaston	4·36	18·93	12·73	22·48
Tanunda	5·02	18·61	12·79	22·20
Lyndoch	5·79	23·14	13·04	22·88
Williamstown	6·11	23·57	16·18	27·47
Adelaide Plains.				
Mallala	3·76	14·00	9·24	16·66
Roseworthy	4·36	14·93	9·88	17·29
Gawler	3·42	14·90	11·19	19·09
Two Wells	3·39	12·98	9·49	15·83
Virginia	3·28	14·20	10·18	17·31
Smithfield	4·02	15·53	9·93	17·16
Salisbury	4·58	17·57	8·72	18·45
North Adelaide	5·45	18·19	13·19	22·22
Adelaide	5·01	16·29	12·70	20·05
Glenelg	3·73	12·32	11·11	18·37
Brighton	4·44	14·25	12·48	21·34
Mitcham	7·19	20·56	15·15	24·06
Glen Osmond	7·15	22·06	15·60	25·78
Magill	7·73	22·72	15·22	25·24

RAINFALL—*continued.*

Station.	For July, 1923.	To end July, 1923.	Av'ge. to end July.	Av'ge. Annual Rainfall
MOUNT LOFTY RANGES.				
Teatree Gully	7·65	27·06	16·29	27·65
Stirling West	9·84	38·20	27·75	46·59
Uraidla	10·75	37·92	26·42	43·92
Clarendon	6·20	24·72	19·75	32·98
Morphett Vale	4·75	16·47	13·64	22·79
Noarlunga	4·99	17·09	12·31	20·35
Willunga	4·92	19·03	15·74	25·89
Aldinga	3·92	13·77	12·59	20·35
Myponga	5·67	20·93	17·78	29·16
Normanville	4·51	15·06	13·77	20·61
Yankalilla	5·14	18·85	14·45	23·10
Mount Pleasant	6·11	23 99	15·79	27·16
Birdwood	6·46	25·96	16·96	29·33
Gumeracha	7·92	31·65	16·63	33·29
Millbrook Reservoir	8·95	32·04	—	—
Tweedvale	7·92	30·94	20·77	35·55
Woodside	5·56	25·95	18·52	32·11
Ambleside	5·84	28·49	19·89	34·67
Nairne	4·18	20·71	16·50	28·42
Mount Barker	5·16	26·45	18·11	31·18
Echunga	5·89	28·44	19·42	32·96
Macclesfield	4·49	22·84	17·49	30·57
Meadows	5·92	27·63	20·88	36·04
Strathalbyn	3·58	11·36	11·27	19·32
MURRAY FLATS AND VALLEY.				
Meningie	3·61	14·24	11·06	18·66
Milang	2·34	8·79	11·24	15·40
Langhorne's Brdg.	2·19	10·25	8·35	14·61
Wellington	2·19	8·73	8·43	14·77
Tailem Bend	2·04	8·82	8·02	14·55
Murray Bridge	1·25	7·29	7·98	13·93
Callington	2·03	10·27	8·83	15·42
Mannum	1·34	5·75	6·85	11·64
Palmer	1·69	9·99	8·49	15·47
Sedan	1·59	8·05	7·10	12·29
Swan Reach	1·25	5·59	6·08	11·09
Blanchetown	0·72	3·38	5·78	10·16
Eudunda	2·44	10·28	8·79	17·54
Sutherlands	1·60	6·18	6·06	11·19
Morgan	1·11	4·27	4·99	9·30
Waikerie	1·35	3·93	5·28	9·91
Overland Corner	1·17	3·94	6·08	11·07
Loxton	1·94	6·19	7·01	12·63
Renmark	1·56	4·84	6·84	11·09
Monash	1·49	5·65	—	—
WEST OF SPENCER'S GULF.				
Eucla	0·83	3·10	6·84	10·02
White Well	1·17	3·43	5·47	9·08
Fowler's Bay	2·25	9·04	8·03	12·16
Penong	2·88	7·48	8·01	12·49
Ceduna	2·53	6·67	6·09	10·36
Smoky Bay	2·49	9·39	6·72	—
Petina	2·86	8·46	7·71	13·34
Streaky Bay	2·64	9·71	9·77	15·10
Talia	2·40	10·17	8·84	16·45
Port Elliston	2·85	12·88	10·50	16·55
Cummins	3·17	12·21	10·83	18·90
Port Lincoln	3·49	12·14	12·14	19·72
Tumby	1·76	7·40	8·27	14·76
Carrow	1·81	7·07	7·69	14·18
Arno Bay	2·07	7·56	7·34	13·30
Cowell	1·01	4·57	6·99	11·75
YORKE PENINSULA.				
Wallaroo	1·88	8·80	8·81	14·18
Kadina	2·72	10 62	9·83	16·05
Moonta	2·46	9·55	9·59	15·38
Green's Plains	2·57	11·32	9·40	18·89
Maitland	4·22	14·84	12·16	20·15
Ardrossan	2·09	9·35	8·39	14·11
Port Victoria	3·55	11·50	9·51	15·47
Curramulka	2·93	12·00	10·83	18·22
Minlaton	3·39	13·11	10·73	17·91
Brentwood	2 90	11·99	9·41	15·83
Stansbury	3·09	12·69	9·99	17·04
Warooka	3·69	15·28	10·83	17·81
Yorketown	3·71	12·11	10·66	17·26
Edithburgh	3·75	11·17	10·04	16·58
SOUTH AND SOUTH-EAST.				
Cape Borda	4·29	16·37	16·20	25·10
Kingscote	3·25	13·83	11·83	19·10
Penneshaw	3·66	10·74	11·14	19·39
Victor Harbor	3·82	13·22	12·93	21·45
Port Elliot	3·06	12·58	13·03	20·26
Goolwa	3·30	10·96	10·73	17·87
Pinnaroo	3·86	11·00	8·43	15·66
Parilla	3·24	9·98	7·63	14·65
Lameroo	3·52	11·01	8·68	16·37
Parrakie	2·76	10·16	7·44	14·54
Geranium	2·91	10·75	8·79	16·19
Peake	2·67	9 58	9·11	16·58
Cooke's Plains	2·87	10·85	8·49	15·04
Coomandook	2·83	9·60	9·90	17·48
Coonalpyn	3·38	12·25	9·83	17·42
Tintinara	3·66	14·66	10·29	18·60
Keith	3·03	12·70	9·93	18·17
Bordertown	3·68	13·12	10·78	19·44
Wolseley	4·12	14·32	10·00	18·12
Frances	3·35	13·99	10·62	19·78
Naracoorte	3·82	15·49	12·72	22·52
Penola	4·11	16·51	14·91	26·29
Lucindale	4·28	16·01	13·35	22·95
Kingston	4·32	16·16	15·54	24·47
Robe	4·03	17·55	15·37	24·59
Beachport	3·84	15·46	17·30	20·24
Millicent	5·58	21·96	17·89	29·36
Kalangadoo	4·97	22·46	—	—
Mount Gambier	3·86	17·89	17·98	31·24

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS

Branch.	Report on Page	Dates of Meetings	
		Aug.	Sept.
Alawoona	*	—	—
Aldinga	‡	22	26
Allandale East	‡	24	21
Amyton	*	27	24
Angaston	*	—	—
Appila-Yarrowie	*	—	—
Arthurton	§	—	—
Ashbourne	‡	—	—
Balaklava	*	11	8
Balhannah	A.M.	24	21
Barmera	*	21	25
Beetaloo Valley	58	22	—
Belalie North	*	25	22
Berri	A.M.	29	26
Big Swamp	*	—	—
Blackheath	90	24	28
Black Springs	‡	—	—
Blackwood	‡	20	17
Block E	‡	—	—
Blyth	*	4	1
Booleroo Centre	*	24	21
Borrika	*	—	—
Brentwood	68	23	20
Brinkley	*	25	22
Bundaleer Springs	*	27	24
Bute	*	21	25
Butler	*	—	—
Calca	*	—	—
Cadell	A.M.	—	—
Canowie Belt	*	—	—
Carrow	A.M.	23	20
Cherry Gardens	*	21	25
Clanfield	*	—	—
Clare	66	—	—
Clarendon	*	20	24
Claypan Bore	*	29	26
Cleve	*	22	19
Collie	72	—	—
Colton	73	31	28
Coomandook	90	22	19
Coonalpyn	A.M.	24	28
Coorabie	*	—	—
Cradock	*	—	—
Crystal Brook	61	24	21
Cungena	*	—	—
Currency Creek	*	—	—
Cygnet River	90	23	20
Darke's Peak	*	—	—
Denial Bay	*	—	—
Edillilie	*	25	29
Elbow Hill	*	28	25
Eurelia	58	17	14
Farrell's Flat	60	24	21
Frances	*	25	29
Gawler River	62	27	24
Georgetown	*	25	22
Geranium	A.M.	25	29
Gladstone	A.M.	24	21
Glencoe	*	—	—
Glossop	*	22	29
Goode	*	29	26
Green Patch	73, 78	20	24
Gumeracha	92	27	24
Halidon	*	22	26
Hartley	*	22	—
Hawker	*	28	25
Hilltown	*	—	—
Hookina	A.M.	23	20
Inman Valley	*	—	—
Ironbank	‡	25	22
Kadina	*	—	—
Kalangadoo (Women's)	*	—	—
Kalangadoo	A.M.	11	8
Kangarilla	A.M.	—	—
Kanmantoo	*	25	22
Keith	*	—	—
Ki Ki	79	—	—
Kilkerran	71	23	20
Kimba	*	—	—
Kingscote	*	—	—
Kingston-on-Murray	*	—	—
Kongorong	§	23	20
Koonibba	*	24	21
Koppio	*	20	24
Kybybolite	‡	23	20
Lake Wangary	*	25	22
Lameroo	79	24	28
Laura	A.M.	25	22
Lenswood and Forest Range	‡	—	—
Lipson	78	—	—
Lone Gum and Monash	A.M.	22	19
Lone Pine	66	—	—
Longwood	*	—	—
Loxton	81	—	—
Lucindale	*	—	—
Lyndoch	66	24	20
McLachlan	A.M.	—	—
MacGillivray	*	21	25
Maitland	*	23	20
Mallala	*	20	17
Maltee	73	24	21
Mangalo	*	—	—
Marama	A.M.	27	24
Meadows	92	22	19
Meningie	*	—	—
Milang	*	11	8
Millicent	A.M.	4	1
Miltalie	74	25	24
Mindarie	*	6	3

INDEX TO AGRICULTURAL BUREAU REPORTS—*continued.*

Branch.	Report on Page	Dates of Meetings. Aug.	Sept.
Minlaton	*	24	21
Minnipa	*	22	19
Monarto South	84	—	—
Moonta	§	24	21
Moorak	96	23	20
Moorlands	*	—	—
Moorook	84	24	21
Morchard	A.M.	25	22
Morphett Vale	*	23	27
Mount Barker	‡	22	19
Mount Bryan	‡	—	—
Mount Byran East	*	—	—
Mount Compass	*	—	—
Mount Gambier	A.M.	11	8
Mount Hope	78	26	22
Mount Pleasant	*	—	—
Mount Remarkable	*	—	—
Mount Schank	*	—	—
Mundalla	*	22	19
Murray Bridge	84	21	29
Mypolonga	*	22	19
Myponga	*	—	—
Nantawarra	*	23	20
Naracoorte	100	11	8
Narridy	*	25	22
Narrung	*	25	22
Neeta	*	—	—
Nelshaby	‡	25	22
Netherton	A.M.	24	21
North Booborowie	60	—	—
North Bundaleer	*	—	—
Northfield	*	—	-
Nunkeri and Yurgo	*	5	2
O'Loughlin	*	22	19
Orroroo	*	—	—
Owen	64	24	21
Parilla	85, 86	24	21
Parilla Well	88	27	24
Parrakie	*	—	—
Paruna	*	—	—
Paskeville	*	24	21
Pata	88	23	—
Penola	§	4	1
Petina	*	25	29
Pinnaroo	‡	24	28
Pompoota	*	8	12
Port Broughton	*	24	21
Port Elliot	*	18	15
Port Germein	*	—	1, 29
Pygery	*	25	22
Ramco	*	20	24
Rapid Bay	93	4	1
Redhill	A.M.	23	25
Rendelsham	*	22	19
Renmark	‡	23	20
Riverton	*	—	—
Riverton (Women's)	*	—	—
Roberts and Verran	74	23	20
Rockwood	*	20	24
Rosedale	64	—	—
Rosy Pine	*	—	—
Saddleworth	*	24	—
Saddleworth (Women's)	66	14	—
Salisbury	66	7	4
Salt Creek	*	—	—
Sandalwood	*	—	—
Shoal Bay	*	21	25
Smoky Bay	74	—	—
Spalding	*	—	—
Stockport	68	—	—
Streaky Bay	*	—	—
Strathalbyn	*	28	25
Talia	78	13	10
Tantanoola	*	25	22
Taplan	*	21	25
Tarcowie	*	21	25
Tarlee	68	—	—
Tatiara	*	18	15
Two Wells	*	—	—
Uraidla & Summertown	*	6	3
Veitch	*	—	—
Virginia	*	—	—
Waikerie	*	—	—
Wall	*	—	—
Wanbi	*	—	—
Warcowie	*	—	—
Watervale	*	—	—
Weavers	72	20	24
Wepowie	§	—	—
Whyte-Yarcowie	‡	—	—
Wilkawatt	‡	25	22
Williamstown (Women's)	‡	1	5
Williamstown	68	24	21
Willowie	58	22	19
Wilmington	*	22	19
Windsor	*	21	25
Winkie	*	20	24
Wirrabara	61	—	—
Wirrega	*	—	—
Wirrilla	‡	25	22
Wirrulla	76	—	—
Wolowa	*	—	—
Wudinna	*	25	22
Wynarka	*	—	—
Yabmana	*	—	—
Yacka	*	21	25
Yadnarie	76	21	25
Yallunda	*	—	—
Yaninee	*	—	—
Yeelanna	78	25	22
Yongala Vale	*	—	—
Yorketown	*	—	—
Younghusband	89	23	27

* No report received during the month of July. ‡ Held over until next month. † Formal.
A.M. Annual meeting.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

WILLOWIE (Average annual rainfall, 11.90in.).

May 24th.—Present: eight members.

COLT BREAKING.—Mr. F. Starkey contributed a paper on this subject. All farmers, he said, should understand the method of handling a colt. Many horses could be found that were mouthed on one side only through people not exercising care when breaking them in. He favored a strong yard and crushpen for catching young horses. When in the crushpen the colt should be rubbed down until he lost all fear. The bridle could then be put on, the bit inserted in its mouth, the mouthing gear attached, and the colt left alone for some little time. The colt could then be caught, a rope tied on each side, and an endeavor made to drive him about. In no case should the horse be run around in a circle with one rein, or he would become mouthed on one side only. If the colt became sulky when caught, and lied down, the best plan would be to use the whip, but if that did not succeed, a pair of quiet horses should be procured and an endeavor made to try and coax it along. If the horse still remained stubborn, it should be turned out for a day of two, and after that it would generally lose its sulkiness if touched with the whip; but the whip should not be used any more than was absolutely necessary or the horse would become frightened. He favored hitching the horse to a log for drawing about before placing it in a team. When commencing hard work, care should be taken to ensure that the horse did not get sore shoulders. If it was free from that complaint whilst being broken in, it would generally be found that the shoulders would not become sore afterwards. He advised all colt-breakers to study the animal they were handling, and ascertain which treatment was answered to best. He favored placing a branbag which had previously been dipped in cold water and rung out, under the collar to prevent scalding. A good discussion followed the reading of the paper.

At a meeting held on June 21st Messrs. L. G. McCallum and F. Bull gave a demonstration of sheep dressing, which was watched with interest by those present.

EURELIA, July 12th.—Mr. W. T. Brown read articles dealing with the various breeds of sheep. The speaker also dealt with the breeds of sheep most suitable for lamb raising and the best sheep for wool. A lengthy and interesting discussion followed.

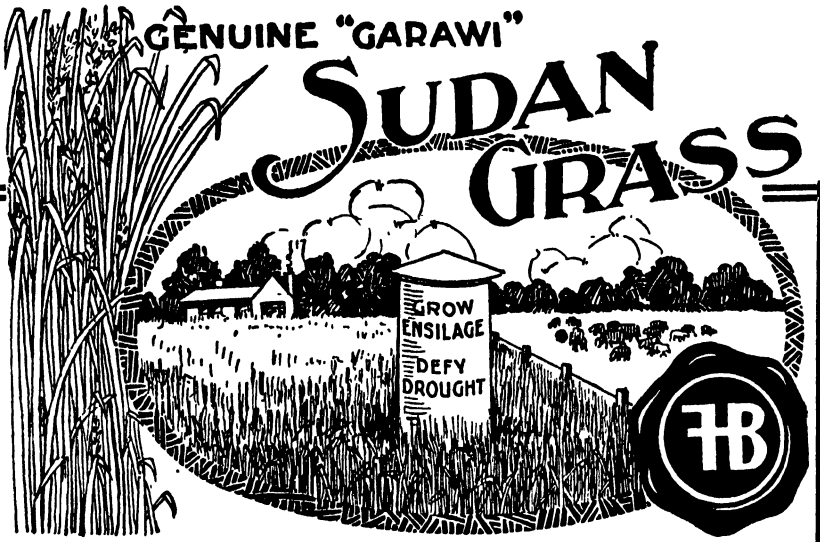
MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

BEETALOO VALLEY (Average annual rainfall, 23.50in.).

June 28th.—Present: 14 members and two visitors.

MAKESHIFTS ON THE FARM.—Mr. A. H. Clogg, who read a paper under this title, said the practice of forming a makeshift to take the place of some permanent repair often led to considerable loss of time and money, and injury to stock. The



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BRUNNINGS

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most common makeshift noticed on many farms was that of drawing a wire or two across an opening in a fence to take the place of a gate. Very often the farmer did not take the trouble to place a permanent gate in the fence until the stock had been injured, the women folk had torn their dresses, and the men their hands. Wire could frequently be used to good purpose for mending broken chains or to take the place of a lost bolt in an implement, but too frequently such makeshifts were used to excess. Sheds were sometimes erected with straw roofs and brush walls, and although they served the purpose of housing the stock and implements for some time, there was always the danger of their catching fire, whereas an iron shed could be built at a small cost and last for a considerable time. One very serviceble makeshift that the speaker referred to was the using of old reapers for fowlhouses and pigsties.

FARRELL'S FLAT.

June 28th.—Present: 19 members.

Mr. E. B. I'Anson read a paper, "Lamb Tailing," and an interesting discussion followed.

FEEDING TESTS WITH PIGS.—The Hon. Secretary (Mr. J. D. Thompson) gave the following results of a test that he had carried out in feeding barley to pigs:—Pig at five months old weighed 83lbs., and after being fed on 6lbs. of whole barley for 26 days weighed 124lbs. The ration was then increased to 9lbs. of barley per day for 56 days, when the pig turned the scale at 235lbs., and when sold in the market realised £5 10s.; 660lbs of barley was consumed by the pig, the market price of the grain being 2s. 9d. per bushel.

NORTH BOOBOROWIE (Average annual rainfall, 16.35in.).

June 26th.—Present: six members.

POULTRY ON THE FARM.—The following paper was read by Mr. Gaskell:—"To increase the productiveness of the farm should be the aim of every man on the land. Nearly every farmer is interested in the raising of stock of some description, and stock products constitute a very large proportion of our agricultural production. High-priced land, high cost of living, high rates of interest, and expensive labor make it essential that everything possible should be done to increase the yield from every acre, to show a profit on the work of the farm. Well-bred stock are no more expensive, so far as the feeding is concerned, than inferior animals, but they bring in increased revenue. Well-bred sheep cut more wool and make better mutton than those of mixed breeding. A herd of pure-bred cattle will bring in better returns than crossbreds, whether for beef or dairy production. Pure-bred fowls of a good laying strain will produce more eggs than crossbreds, whilst the old hens and surplus cockerels will be more easily disposed of and will realise better prices. It is a very expensive item for a farmer to establish a herd of pure-bred cattle or sheep, but that cannot be said of poultry. With poultry, a few pounds and a few months' work will produce a fine flock of fowls capable of paying for the initial outlay many times over. The Breeding Pen.—A small house with a small yard attached is needed to accommodate a pen of four fowls—three hens and a cockerel. The house should be warm and the yard entirely netted against foxes. The fowls should be provided with shell grit, scratching material, green feed, and not too much food. These fowls should be bought from a well-known reliable breeder. One of the best breeds for the farm would be a good laying strain of Black Orpingtons. They are only second to White Leghorns for laying, and would supply better poultry for the table and bring better prices for the cockerels than the lighter breed. It would be necessary to pay three to four guineas for these fowls, but it would be money well spent. The hens should be in their second year and the cockerel about a year old. These would be best bought in May or June and put in the pen straight away. After the breeding season is over they could be let out, so long as they are marked with a leg ring. Hatching.—For the best results, hatching should take place from June to September if possible, but for a farmer who relies on broody hens, a little later would

be all right. All outside roosters should be disposed of to prevent crossbreeding. As the outside hens become broody they should be supplied with eggs from the pen. If possible, other hens should be kept away, and in any cases the pen eggs should be marked. If a farmer has a little time and money to spare, he could, with advantage to himself and his poultry, adopt some of the following practices:—The outside fowls should be provided with a good roosting-house, open to the east, with plenty of swinging perches of a uniform height. Another house could be provided for scratching. It is wonderful what a difference a warm dry scratching-house makes to the fowls during cold, wet weather. The exercise and warmth encourages them to lay better and keeps them healthy. In a country where there are foxes it would pay to have both these houses enclosed in a small netting yard. The fowls could be fed there at night and then shut up. This would not only protect them from the foxes, but also keep them from roosting in the stable and implement-shed. A supply of shell grit for the outside fowls would cost little and be very little trouble. Fresh water should be supplied. The best and easiest method is that of a dripping tap in a shady place. Kerosene-tin nest boxes are easy to make and do not harbor vermin. Broody hens can be set in them in a place where they can come off for food and water without being disturbed by other fowls. Chickens could be hatched in an incubator and reared in a brooder. This would mean early chicks, which would lay when eggs are scarce. However, the average farmer would hardly care to worry about an incubator nor about some of the other things mentioned above. Much, however, might be done, with very little trouble and expense, to improve the poultry on the farm. Even if a farmer did not care to buy a breeding-pen, he might, by buying a good cockerel every year or so, very greatly improve the laying qualities of his poultry. This same breeding-pen could be used the following year. The next year it would be advisable to pick out, say, six of the best two-year-old hens and mate them with a good cockerel bought from the breeder that supplied the original pen. Thus the cost of breeding would be, after the first year, about one guinea per year."

WIRRABARA (Average annual rainfall, 18.91in.).
June 2nd.—Present: 15 members.

PAINTING.—"Wagons, buggies, drays, and any other vehicle, especially those of wooden construction, require a coat of paint once a year, or every two years at the outside," said Mr. H. H. Jericho in a paper under the heading "Painting." Holding such work over for a long period was disastrous to the article or vehicle that required a coat of paint. The wood became weatherbeaten and commenced to crack, water soaked into the cracks, and in a very short time the wood decayed. A coat of paint on weatherbeaten wood did not make a good job, and, in addition, such wood required more paint than that having a smooth surface. Before the paint was applied, the wood should be thoroughly cleaned, all the old paint scraped off, and if necessary a blowlamp should be used to clean the wood. If colored paints were to be used the speaker thought it was the best plan to obtain white paint and then add the desired color of ochre. The paint should be thoroughly mixed and strained before being used. The first coat should not be thick; turps and oil should be added to the paint. It should be allowed to dry thoroughly before the second one was applied. The surface of the wood should be brushed and the paint would dry out with a fine glossy finish. All fine cracks should be noticed, and care taken to see that the paint was well brushed into them. If the cracks were large they should be filled in with putty. The woodwork of the house, scotiaboards, window and door frames, and the verandah required an occasional coat of paint. Many people still adhered to the practice of whitewashing the walls of the rooms, others favored paper on the walls, while some favored calsomine. The writer held the opinion that once a smooth surface was obtained on the walls they should be covered with a coat of paint. Walls that had been painted could easily be cleaned with a damp cloth should they become dirty.

CRYSTAL BROOK, July 5th.—The Director of Agriculture (Professor Arthur J. Perkins) attended the meeting and delivered an address in which he dealt with several agricultural problems relating to local conditions.

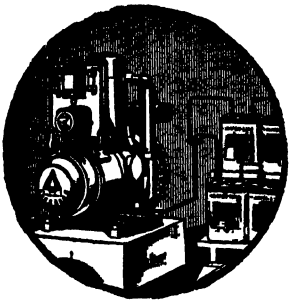
LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

GAWLER RIVER (Average annual rainfall, 17in. to 18in.).

June 26th.—Present: 10 members.

MIXED FARMING ON SMALL HOLDINGS.—The following paper was contributed by Mr. W. Chamberlain:—"On small holdings it is necessary to produce many different lines in order to make the farm a paying proposition. Much of the success, however, depends on the quality and management of the soil. It is necessary to have the land subdivided into small paddocks, so that each paddock may be made to produce some crop each year. Much of the land in our immediate district is highly suitable for intense cultivation, and the time is not very far distant when a large area of it will be cut into even smaller holdings, made to produce greater wealth, and keep a much larger population, which is one of Australia's greatest needs. On small holdings each farmer should endeavor to put the greater portion of his land to some commercial use each year, and this can largely be done by growing a rotation of crops. When land costs £20 or more an acre it is too dear to be producing only one crop in two years. The small farmer should be careful not to overstock his farm. Four good horses can do all the necessary team work of a 100 acre farm if properly fed and cared for. Ten or 12 good cows should be kept, and it pays any farmer to keep a good class of stock. Of course, it is a matter of opinion which is the best breed of cattle to keep, but for the small landholder, I certainly favor Jerseys. They yield milk rich in butter fat, give a fair average milk suply, and are more contented and more easily kept than some of the other breeds. There is a great future for the dairying industry in South Australia, but it badly needs organising. The majority of dairy farms are not paying under the present conditions. There must be great changes in the methods of holding and distribution of dairy produce before the average dairyman can say that he has a paying proposition. Every farmer who keeps cows should put a few acres of summer fodders, such as maize, lucerne, Sudan grass, &c., under crop each year. If he does this, the cows will not require so much chaff and very little bran, and then a good portion of the hay that is grown can be sold. Another important line for the small farmer to consider is that of pig raising. To make a success of the venture a pig-proof paddock of about two acres sown with barley, with a stack of straw in the centre, should be provided. The next consideration should be the selection of good quality sows. Whatever the choice of breed might be, the pigs should be of good quality and true to type. It does not pay to breed from mongrel sows. It is equally important to use a well bred boar. I favor the Berkshire sow and Mid-York boar. Where separated milk is available, pigs are almost a necessity. The time is not very far distant when the pig will prove of great wealth to the State. Present conditions are not very encouraging, for all the producer has to depend on is the limited local demand. When that is over supplied, down comes the price of pigs, and breeders cease raising pigs. Before pig raising can become an established industry, it will be necessary to secure and establish a permanent oversea market. Such prospects appear to be exceedingly good. Great Britain is a heavy importer of pig products, and at present draws the greater part of her supplies from the United States and Canada. Why cannot we share in this demand? In America the staple product for fattening pigs is maize, whereas in Australia barley can be used to a very large degree. I have in mind another important industry to our State which, at the present time, is much neglected, and that is potato culture. This line can be increased to a great extent even in our district. We have, between Gawler and Angle Vale, some of the finest land in South Australia for potato growing. There are hundreds of acres of rich river flats most suitable for the potato, more especially the early varieties. Perhaps some of us do not realise that we, as a State, are importing 75 per cent. of the local requirements. Why should we do this when we have the soil that is suitable, and a railway almost at our door, and a profitable market at hand."



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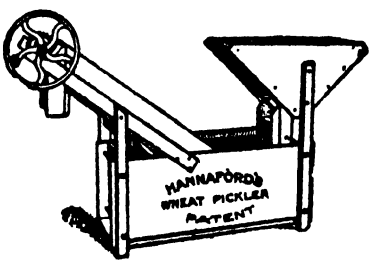
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OWEN.

June 22nd.—Present: six members.

TYPE OF HORSE MOST SUITABLE FOR THE FARM.—Mr. J. B. McPharlin contributed a paper on this subject. No doubt the tractor had the advantage in the way of longer hours and faster working, he said, but he preferred to sit behind a good team of horses than behind a greasy and noisy engine. He did not favor the large draught horse, because that type of animal was slower, consumed more feed to keep up his condition, was inclined to be clumsy, especially when working in boggy land, and often required more care in regard to his health. For carting on the road where the animal could get a solid footing, and where a strong pull was needed, such as getting out of the paddock, or over a broken road, the large horse might show to advantage, but in the team on the farm where an extra horse was put in the team rather than have heavy going, and where the draught was more even than road work, a brisk walker was the ideal horse. He preferred an animal about three-fourths the weight of a heavy draught horse, with good bone, but fairly clean legs, and a round, well-ribbed barrel. Wide shoulders were also to be preferred to give a good bearing for the collar. If the horse was a little longer in the legs that would be no fault, because that type would walk better than the short-legged animal. The active, tractable horse with an even pace, that would do a good day's work without getting leg weary, and would go through a hard season's work without losing much flesh, was the animal most suited for the farm, and he thought those points could more often be found in the medium than in the heavy draught. If a pair of horses were needed in the trolley to trot into the railway station for a light load, or for other similar jobs about the farm, the medium horse would have the advantage. Color was not a very important point so long as it was a decided color. One could not procure a better color than a bright chestnut with silver mane and tail. A horse of that color in good condition always had a very clean appearance. A bright bay with black points was perhaps the most popular, and a very good color. That type generally had dark hoofs, which, although sometimes rather brittle, were very much better than white hoofs. He preferred a black horse. It was generally hardy, and would also have black hoofs. If the farmer had one or two suitable mares he should rear his own horses, taking care, always, to breed from the best obtainable. A good-shaped, active mare mated to a well-bred Shire or Clydesdale stallion should produce a foal that would make a good type of farm horse. He thought that if the farmer bred and broke in his own horses they would usually suit him much better than a bought animal. The most suitable type of horse for the farm was very much a matter of personal opinion, but his ideal was a well-built, well-bred, active, medium draught. During the discussion which followed, Mr. C. L. Marshman said he preferred the nuggetty, short-legged horses with clean legs. He maintained that they were very healthy, noted for longevity, and were good workers. Mr. A. Freebairn also thought that a nuggetty, medium-sized horse, with clean legs, was the most economical animal, and kept its condition better than most horses. Mr. W. J. Marshman stated that different types of country required different types of horses. Mr. R. S. Harkness preferred a fairly big, powerful horse, with a strong constitution, which was indicated by its general appearance and well-filled middle, a horse that could walk along at a good pace and keep it up even on heavy work. The legs should be fairly clean, because hair was an advantage for show or sale purposes only. A team of large horses would perhaps be steadier, but would be able to stand longer hours than the lighter type of animal. They would also be better fitted for carting on roads, and for dray work on the farm. With the advent of the tractor he thought that type of horse would be in much greater demand.

ROSEDALE.

May 31st.—Present: six members and visitors.

The Manager of the Turretfield Demonstration Farm (Mr. F. E. Waddy) attended the meeting and delivered an address, "The Business of Farming."

CARE AND MANAGEMENT OF HORSES.—A further meeting was held on June 27th, when a paper dealing with the subject, "Care and Management of

Horses,'' was read by Mr. H. Falting. The first point to be considered in the care of the team was the stable, which should be enclosed with a stone wall, roofed with iron, and provided with plenty of ventilation. He thought it advisable to allot each horse a separate stall in which it should be tied, in order that no time would be lost in chasing the animals around the yard when they had to be harnessed. A piece of rock salt or salt lick should be placed in the manger, because the salt helped to keep the animals in good health. When the horses had been turned out for some time, it was not advisable to work them too hard for the first day or two. Light work for the first few days would give their shoulders a chance to harden and become accustomed to the work. When fitting collars on the horses, it was best to have the collars fit somewhat tightly, rather than too loosely. Large collars chafed the skin and caused sore shoulders. A very handy and useful tool for use in the stable was a small hook made of fencing wire. By making a small cut in the lining on the side of the collar sufficient padding could be removed to prevent a sore from developing on any weak part of the shoulder. Another useful tool was a wooden mallet weighing about 2lbs., with which a lump could be reduced in the lining of the collar. Horses that were thin skinned and prone to develop sore shoulders, should be worked with a folded bran bag placed under the collar. The bag should be washed occasionally to remove dried sweat and dust. If an extra horse or two were worked in the team, it would often be the means of keeping the team free from sore shoulders. Good wheaten hay chaff, cut when somewhat green, should be fed to the working horses, and if the work was heavy, crushed oats or bran should be added to the chaff. On no account, said Mr. Falting, should the horses be worked after the sun had set. The horses should be thoroughly groomed whilst they were feeding, and allowed 1½ hours for breakfast and the same time for the mid-day meal. When the team was called upon to work a long day it should be allowed two hours for dinner. He did not approve of the ''one yoke'' system of working the team, whereby the horses were obliged to work six or seven hours without a break. If the team was fed in the field the collars should be removed in order to allow the animals to have their meal in comfort. Every farmer should endeavor to breed one or two foals each year, to maintain the strength of the team and to replace any animals that were sold. The brood mare should be kept in good health and condition, and she could, with benefit to her health, be worked within a fortnight of foaling time, provided the work was of such a nature that she would not be liable to strain herself. When there was not an abundance of feed in the paddocks, the foals should be given long hay or chaff. He thought it was a good practice to tie up the foals when they were being weaned. If that were done they would not knock themselves about and the handling would considerably lighten the work of breaking. If well-grown and in good condition, the colt could be put to work at 2½ to 3 years old, but care should be taken not to overwork the youngster during it first season in the team. Finally, every farmer should keep on hand a supply of medicine for the common ailments of the horse.

The Advantages of Growing Oats and Barley.—The following paper was read by Mr. E. Lienert:—''Though wheat growing still seems to engage most of our attention in cropping operations, experience is teaching us that this crop is not so suitable to our soil conditions as oats and barley. We have had convincing proof of this in recent seasons. Ready markets and prevailing high prices are no doubt great factors in inducing farmers to give so much attention to the cultivation of wheat, but this is a short-sighted policy, and if persisted in, must eventually reduce our soils to a low state of fertility. I do not advocate discarding wheat growing altogether, but I do think oats and barley should constitute half the area sown; three-eighths oats, and one-eighth barley. The greater proportion of the wheat grown on the farm is carted off with all the fertility it contains, but if we are going to pay due regard to maintaining, and increasing our soil fertility, this practice must be limited as much as possible. Our soils are not very fertile through lack of humus. There seems to be only one way of increasing the supply of humus, and that is by carrying more livestock. Admitting that the oat and barley crops are those to which our soils are best adapted, it must afford the best means of increasing the stock carrying capacity on the farm. Viewed from the standpoint of general adaptation for feeding livestock, oats stand alone for horses. No other cereal can be fed to stock with

entire safety or in such large quantities. For cows in milk oats are at least as valuable as bran. It is for sheep that the growing of oats chiefly concerns farmers in this district, because we often have to resort to hand feeding. Barley for pigs and poultry is without a rival. Another advantage is the feed the stock are deriving from the oat and barley stubbles, which I value at double that of wheaten stubble. Apart from their usefulness for general feeding purposes, oats and barley are essential in our cropping system. On examining a heavy crop of oats or barley one rarely finds any weeds, and they also check the growth of summer weeds, such as stinkwort, hog weed, &c. This again gives a better chance for feed the following winter. Another advantage in growing these crops is that oats can be sown early and barley late, thereby helping considerably in distributing the rush of work at seeding time. As regards barley, which is liable to go down and thus become difficult to handle, one is able with modern machinery to harvest the greater portion of the crop. We can also afford to lose a small portion of the crop, for by growing barley we are adding from one-half to one ton of hay, or 10 to 15 bushels of wheat per acre, to the crop that is sown the following year.

SALISBURY (Average annual rainfall, 18.57in.).

July 4th.—Present: 12 members.

Mr. F. C. Fleet, who contributed a paper under the heading, "How Shall Money be Raised by Taxation for the Construction and Maintenance of Main Roads," first gave a detailed description of the term "main road," and outlined the way in which money was granted to district councils at the present time for the construction of roads. Many suggestions and different forms of taxation had been placed before the Government; wheel tax, motor tax, horseshoe tax, &c., but Mr. Fleet considered that if vehicles were licensed to travel on, or use, main roads, and the whole of the money so collected spent on the roads some improvement in the condition of the roads would be obtained. With the money obtained for such a tax he would include that raised from the licensing of vehicles, money paid by owners of motor vehicles, drivers, &c., and to further protect the roads the size and weight of a load should be limited and the speed of motor cars regulated. The annual Report of the work performed by the Branch during the past year was presented by the Hon. Secretary (Mr. A. U. Urlwin) and the officers were elected for the ensuing term.

CLARE, June 20th.—Mr. J. B. Harris (Horticultural Instructor for the Northern District) attended the meeting and gave an interesting and instructive address on the manuring of vineyards and orchards. During the afternoon Mr. Harris demonstrated the principles and practices of pruning to a good attendance of members and visitors.

LONE PINE, June 28th.—Mr. M. Ellis delivered an address, "Co-operation amongst Vinegrowers," to a gathering of 17 members and three visitors.

LYNDOCH, June 28th.—Arrangements were made for pruning competitions, held at Messrs. Springbett Bros.' Hillside Vineyard on Friday, July 13th. A programme of meetings was also arranged for the forthcoming 12 months.

SADDLEWORTH (LADIES'), June 12th.—Mrs. Beard contributed a paper, entitled "Uses for Old Newspapers," in the course of which she mentioned that newspapers could be used for polishing windows, boiling a kettle, and giving additional warmth when placed between blankets. When sheets of newspaper were placed between the clothes they would keep moths away. The writer wrote strongly against the use of newspaper for wrapping around food, which, she thought, should be prohibited. An interesting discussion followed, during the course of which Mrs. Melville mentioned that newspapers could be used for cleaning stoves. Mrs. Coleman then read extracts from the bulletin entitled "Fruit Preserving for Domestic Supplies," by Mr. Geo. Quinn, which was followed by a good discussion.

MONIER SEPTIC TANKS

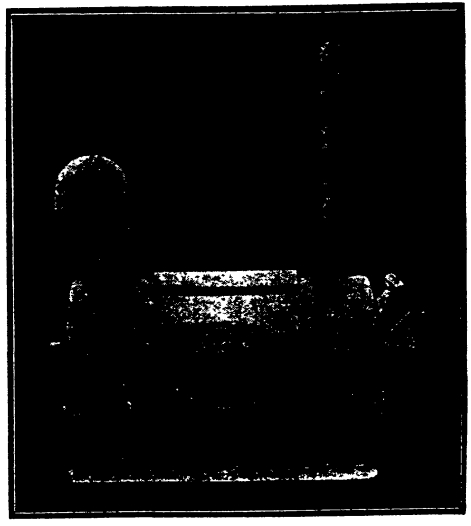
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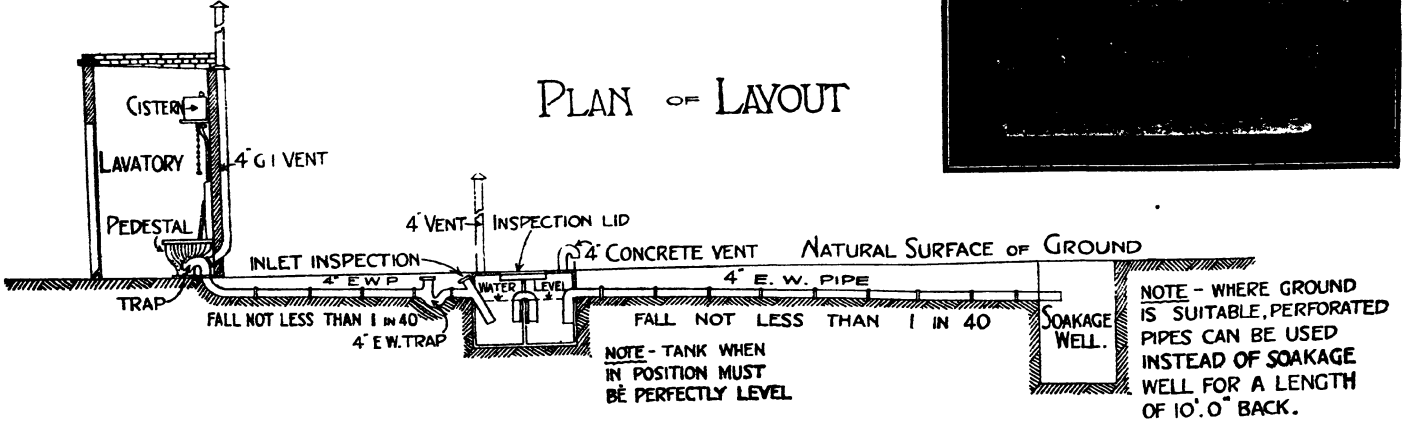
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STOCKPORT, June 28th.—Mr. C. Murray read a reprint from a New South Wales paper, entitled "The Tractor in the Wheat Belt," including notes on fallowing, late seeding, and fertilising. A short discussion followed the reading of the paper.

TARLEE, July 17th.—The Director of Agriculture (Prof. Arthur J. Perkins) attended the meeting and delivered an address, "Agricultural Practices Applicable to the Tarlee District learned from Booborowie Experiences."

WILLIAMSTOWN, July 27th.—Mr. E. D. Powell read a paper, "The Necessity for Sport," and an interesting discussion followed in which Messrs. J. J. Bain, S. Binning, G. Brown, and W. E. Grigg took part. The Hon. Secretary (Mr. Geo. Brown) presented the annual report, and the officers were elected for the year 1923-24.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

BRENTWOOD.

June 28th.—Present: 23 members and two visitors.

ANNUAL MEETING.—The Hon. Secretary (Mr. G. L. Tucker) presented the annual report of the work performed by the Branch during the year 1922-23:—"I have much pleasure in presenting this, the annual report of the Brentwood Branch of the Agricultural Bureau. The last annual meeting was held on June 15th, 1922, when Mr. F. L. Carmichael was elected president and Mr. J. Boundy vice-president. The Hon. Secretary (Mr. G. L. Tucker) was reappointed. In accordance with the regulations, one-third of the members retired, and of these, Messrs. F. Vanstone, E. Vanstone, R. G. Anderson, D. R. Longbottom, and F. J. Nation were re-elected, and were subsequently approved by the Advisory Board of Agriculture. During the year 11 ordinary meetings have been held, and the programme of work drawn up proved a great success, with the result that at each meeting good discussions were initiated, and interest in the Branch has been well maintained. Five new members have been admitted during the year, exclusive of three whose names have been submitted for approval by the Advisory Board, and two members have left the district. The roll strength, not including the three not yet approved, is 26, and it is interesting to note that six of these are foundation members, forming the Branch in April, 1916, and nine have completed over seven years' membership. The consistency of these members has proved, and is proving, a potent factor in the success of the Branch. The average attendance at each meeting shows a decided improvement on last year's, there having been an average of 17.5 members and five visitors at each meeting. The following matters were submitted for expert advice:—Boils on horses, Mr. A. L. Vanstone; cow pox, Mr. Honner; Sudan grass as a fodder, Mr. F. H. Babbage; staked pig, Mr. A. L. Vanstone; breeding from affected mare, Mr. G. Fuller; feeding off self-sown crop, Mr. A. J. Babbage. Matters of importance submitted for the Branch's consideration were:—Farmers' School at Roseworthy, petition in regard to Turretfield Farm, many matters in reference to Yorke Peninsula Conference, crop-growing competitions (further information sought). The delegates to the Annual Congress were Messrs. J. Boundy and H. Le Poidevin, and at a subsequent meeting full reports were given of the proceedings. The Branch was represented at a pruning demonstration at Stansbury by Mr. F. L. Carmichael, who gave an interesting account of the gathering at our next meeting. The opening of the butter factory at Stansbury, the erection of which and the suggestion of an official opening this Branch being largely responsible for, was well attended by our members, who subsequently gave varied and instructive information for the benefit of those members unable to be present at the function. Another matter which it is hoped will result in great benefit to the district is the advocacy by this Branch of improvements and better shipping

facilities at Port Minlacowie. In this connection, a deputation, of which Messrs. J. J. Honner and J. Boundy were the chief spokesmen, introduced by Messrs. H. G. Tossell and Peter Allen, M.'sP., waited on the Hon. Minister of Agriculture on April 11th, 1923. A strong case was made out, and was very sympathetically received by the Minister, who promised to place the matter before the Minister of Marine in as favorable a light as possible. One of the pleasing features of the papers read before our meetings this year was the number of them reprinted by different newspapers from the *Journal of Agriculture*, one paper in particular being printed in three different newspapers. This must be regarded as highly complimentary to those concerned, and is deserving of our heartiest congratulations. The following programme was successfully carried out:—1922—June, 'Afforestation,' Mr. J. H. Boundy; July, 'Fallowing,' Mr. H. G. Boundy; August, 'Care of Farm Implements,' Mr. R. Anderson; September, Question Box; October, 'Care and Management of Farm Horses,' Mr. A. L. Vanstone; November, 'Cattle on the Farm,' Mr. D. R. Longbottom. December, 1922, and January, 1923, recess. 1923—February, 'Harvest Report,' Mr. J. J. Honner, jun.; March, 'Destruction of Vermin,' Mr. F. Vanstone; April, lecture on a trip to Europe, Mr. H. G. Tossell, M.P.; May, Question Box. In addition to the above, one meeting was devoted mainly to making arrangements for the Conference. A selected paper on 'Mallee Farming' was read by Mr. J. H. Boundy at this meeting. The address given by Mr. H. G. Tossell, M.P., is deserving of special mention. This gentleman lectured about his trip to America and Europe to a large and appreciative audience, composed of members and visitors, and at the conclusion of his address all were thoroughly convinced that they had spent an instructive and enjoyable time. The comparisons drawn by the speaker between methods of farming adopted in other countries with those obtaining in our own were well explained, and clearly demonstrated the fact that Mr. Tossell is a keen observer. Perhaps of all the Bureau happenings during the year, the holding of the Yorke Peninsula Bureau Conference at Minlaton, on April 11th, 1923, evoked the greatest interest. The holding of it at this end of the Peninsula was the result of a motion submitted by our representatives at the 1922 Conference held at Moonta, the motion to hold the 1923 one at Minlaton being unanimously agreed to. Minlaton Branch being in a state of suspended animation, our Branch was requested to make the necessary arrangements, and these, with the help of the Weaver's Branch, were so well carried out that the unanimous verdict of those qualified to judge was that the Conference had proved an unqualified success. The Conference consisted of three sessions, at each of which were very satisfactory attendances. Our President, Mr. F. L. Carmichael, presided, and is to be congratulated on the manner in which he conducted the proceedings. The Conference was opened by the Honorable Minister of Agriculture, who gave a splendid opening address, and among other visitors were several of the Agricultural Department officers and the members of Parliament for this district, Messrs. Allen and Tossell. All of our members worked hard to make the Conference a success. but special mention is due to these gentlemen who contributed papers from this Branch:—Mr. F. Vanstone, 'The Destruction of Vermin'; Mr. F. J. Nation, 'Sidelines on the Farm'; Mr. A. L. Vanstone, 'Economy on the Farm'; Mr. E. Correll, 'Co-operative Shearing Sheds.' Much more might be said about the Conference, but I will content myself with voicing a word of appreciation of the catering done by the St. Benedict's Guild, and expressing the hope that the 1924 Conference to be held at Maitland may prove as successful, if not more so, than the last. The roll and attendances of individual members are as follows:—A. E. Twartz 11, R. Anderson 11, A. L. Vanstone 11, L. G. Boundy 11,. R. G. Anderson 10, G. L. Tucker 10, C. H. Boundy 9, H. Le Poidevin 9, H. Launer 8, F. L. Carmichael 8, J. Boundy 8, H. G. Boundy 8, A. J. Babbage 8, R. Biddell 8, J. J. Horner 7, F. J. Nation 6, F. H. Babbage 6, F. Vanstone 6, E. S. Vanstone 6, C. A. Watson 6, A. Twartz 5, D. R. Longbottom 5, J. J. Honner, jun. 5, E. J. Haywood 4, J. Duncan 4, L. A. Traeger 3. Average attendance 17.5 members, 5 visitors, total 22.5. In accordance with the regulations one-third must retire each year, that is the lowest in attendance. Any, or all of these, may be reappointed, subject to certain conditions and the approval of the Advisory Board of Agriculture. In conclusion, gentlemen, I desire to thank you all for your loyal co-operation in

making the past year, the seventh since we started, the success I think you will agree it has been, and my earnest hope is that the Brentwood Branch of the Agricultural Bureau will ever prove an active and live concern."

POULTRY ON THE FARM.—In the course of a paper dealing with this subject Mr. A. J. Babbage expressed the opinion that the light breeds of fowls were the most profitable for the farmer to keep on his holding. He considered White Leghorns from a good laying strain to be the best type of general utility fowl. Pure-bred White Leghorn pullets that had been hatched in August or September would commence to lay when they were about five months old, while the young roosters could be used for table poultry. The Brown Leghorn was also a good type of fowl, it was more hardy than the White Leghorn, and if a good strain was obtained it should prove a profitable breed. The Minorca was another excellent breed, and although somewhat delicate, the birds laid eggs of an excellent size and quality. Unless the farmer had an incubator, the speaker considered that a few hens of the heavier breeds such as the Black Orpington, Barred Rocks, and Rhode Island Red should be kept for hatching purposes. The hens should be allowed to roam about the farm because that helped to keep them in good health, but one should, if possible, prevent the roosters from running with the hens. Six to nine hens should be kept in a pen with a rooster for breeding. Hens after they had been laying for three years should be replaced by younger birds. Clean water and plenty of good food were essential for the success of the poultry run. Geese were a payable form of poultry for Christmas trade, but they were somewhat troublesome to keep on the average farm. Indian Runner ducks were also profitable poultry, both for marketing and egg laying. Turkeys were difficult to rear, because they had to be allowed to run over a good area of ground, and as foxes were very plentiful in many of the country districts, the birds could not be raised to a marketable age unless fox-proof runs and houses were erected. In the discussion that followed Mr. H. Le Poidevin agreed with the paper in respect to the laying strains mentioned. He considered that more could be done in the poultry line, because their climate was one suitable to the rearing of robust chickens. In selecting egg-laying strains, importance should be attached to the size of the eggs produced, because the egg-pulp industry would consider that point in the near future. Not nearly enough attention was given on the farm to ensure a pure supply of drinking water for the poultry, and that resulted in less healthy birds and a poorer egg supply. Mr. R. Biddell thought that farmers depended too much on the feeding of grain to the poultry. He advised supplying the hens with a ration of cooked meat (rabbits, &c.) which would result in greater egg production. Mr. F. L. Carmichael pinned his faith to White Leghorns and Rhode Island Reds as the most suitable breeds for the farm. Although the eggs of the Reds were not so large as the Leghorns, yet the fowl itself was a good table bird and was not to be despised as a layer. Mr. A. E. Twartz considered that more attention should be given to the collecting of the eggs on the farm. They should be gathered at regular intervals, because it was not fair to the consumer to allow eggs to become affected through carelessness in that respect. He also recommended farmers to consider the matter of producing infertile eggs, because once these could be guaranteed they would command a higher market price. Mr. R. Farmer said that for egg production it paid to confine the laying hens. Suitable ventilation should, however, be provided. To obtain the best results for egg production, special feeding rations should be given, and by confining the hens, better control in that direction could be obtained and less food wasted. For breeding purposes more natural conditions should be observed to ensure robust stock. The supply of green feed during the time that natural herbage was scarce would amply repay a farmer's efforts, that being a matter which rarely received attention on a farm. Mr. R. Anderson agreed with a previous speaker in regard to the splendid laying qualities of the White Leghorns, and the general utility of the Rhode Island Reds. In reply, Mr. Babbage considered it might pay to shut up the poultry on a poultry farm, but for the ordinary "cocky" that entailed too much valuable time which was needed for better paying propositions, and he had found that letting the poultry roam about, feeding with plenty of grain seasoned at times with a supply of cooked meat, gave satisfactory returns with a minimum loss of time.

KILKERRAN.

June 26th.—Present: six members.

VARIETIES OF WHEAT SUITABLE FOR THE DISTRICT.—Mr. S. Jones contributed a short paper on this subject. No farming operations were more important than seeding, he said, and if a farmer neglected his seeding he did not receive the best results for his labor. The selection of seed was very important. Every farmer should see that his seed was free from all foreign matter and true to type. No variety of wheat could be said to be the best for all types of soil; different varieties would suit different types of soil. For the red and heavy soil, Federation, Major, and Nugget were suitable; in sandy soil King's Early was one of the best varieties, but not any of those varieties were suited to that district. In a good season Nugget and Major were the best varieties, but they were not to be relied upon on account of their susceptibility to black rust. A variety that was favored very much was Currawa. It was a mid-season wheat, and grew quickly at first, which was an advantage, because it was able to get away from the weeds. It was very easy to reap, stood up well, and was not susceptible to black rust. German Wonder was another good variety, but was not a quick grower, was very tough to reap, and tended to go down. He had sown it for three years and had received a fairly good average, but Currawa yielded 6bush. more each year. In regard to early wheats, he thought Red Russian was one of the best. He had sown it for seven years with good results, but now that the red wheats had been banned, he would not sow them again. Gluyas was another variety that did well in that district. He had received rather poor results from Smutproof and King's Early. In the discussion which followed Mr. T. M. Geater remarked that different soils required different varieties of wheat, and the variable seasons made it very difficult to say which variety was the best for the district. Currawa was a good wheat, but if the spring was dry the early wheats, Smutproof and King's' Early, would yield the best results. The Ford variety would stand a dry season well. Mr. B. A. Koch said the Queen Fan variety was suitable for his soil, but he thought the most important point was to get the seed in at the right time. Mr. B. J. Koch favored Ford. The Chairman (Mr. A. Wakefield) had found that different seasons had a great influence on the different varieties. He thought it was advisable to have at least three distinct types of wheat—early, midseason, and late. The Hon. Secretary (Mr. A. F. Sawade) said he had found Queen Fan and Currawa to be very good. He said members should not be afraid of sowing a wheat that had a reputation for producing straw, because in that district wheats did not, as a rule, develop much straw. In reply, Mr. Jones mentioned that he had grown all the varieties mentioned in the discussion and said that Ford had yielded well, but he had not mentioned them because he thought they could not say which variety was suited to that district unless they had been grown for three years consecutively.

FRIESIAN BULL FOR SALE

The Department of Agriculture has for Sale the Friesian Bull

CHEESEMAN DE KOL 6th.

Born July 15th, 1917, and bred by the executors of the late David Mitchell, Lilydale, Victoria. This bull is by Bolobeck de Kol, from Rosey 20th. The bull is at present at Mount Gambier.

PRICE, 30 GUINEAS.

Further particulars can be had on application to

THE DIRECTOR OF AGRICULTURE.

WEAVERS.

June 25th.—Present: 13 members.

AFFORESTATION.—Mr. J. Sherriff, in a paper on this subject, said the continual destruction of timber that was going on all over the world, and the very slight provision which was being made for either replanting or renewing forests, would result in a timber crisis in years to come. He did not contend that farmers should use land of their own that was suited for agriculture. He thought forestry was a national matter, and one which could only be handled by the State and Federal Governments, but there was an aspect of afforestation which should be the concern of each individual landholder There was no doubt, that the planting of suitable trees, such as pines and gums, added very considerably to the appearance and the value of a farming property. At the present time, much was heard of the many uses to which concrete could be put on the farm, but the speaker held the opinion that concrete would never entirely take the place of timber for buildings and field engineering. Mr. Sherriff also considered that the destruction of forests also had the effect of diminishing rainfall. In their district, they had not yet felt the effects of a shortage of wood for firewood, but he thought that in a generation or two, firewood would be very scarce, and the farmer who had a plantation of timber on his property, would have a very valuable asset. He urged every farmer to make a practice of planting a few trees each year, and even if no commercial return was obtained from them, one would have the satisfaction of knowing the property would increase in value each year, and its appearance would be very considerably enhanced.

WESTERN DISTRICT.

COLLIE.

June 23rd.—Present: seven members.

BRUSH SHEDS.—In a paper on this subject Mr. J. S. Anderson said that if brush sheds were properly erected they would be very useful. They should always be constructed with a steep gable roof. The timber used should be long mallee, and the forks as large as it was possible to handle them. The forks should be placed 12ft. apart lengthways, and 10ft. apart in depth; thus, a shed with, say, 21 forks would be 72ft. long by 20ft. wide. The forks should be either tarred or charred as a preventive against white ants, and placed 3ft. in the ground. Those on the outside should be 8ft. high, and those in the centre 12ft. high, giving a slope of 4ft. Either mallee brush or good broombush would suit for roofing material, with a coat of good straw on top. The back and ends of the shed could be closed in with upright pines or mallee. A mistake was often made, he said, in loading too much brush and straw on a shed. That was not necessary, and the extra weight caused the shed to spread out. To prevent the forks from spreading, a wire could be twitched across between the opposite outside forks. That style of shed would keep out the wet, and would be much cooler in the summer. That type had also been known to last for as long as 30 years. In erecting a brush shed for use as a stable, he advised the same method with the manger constructed down the centre of the gable; the shed forks could then be used for the stall rails. A stable constructed with brush would be very cool for the horses during the summer. He would not advise using a brush shed for cocky chaff. If the following important points were observed the farmer would experience success with that style of shed:—1, Use the largest forks possible; 2, have plenty of slope on the roof; and 3, twitch the forks together at the top from front to rear to prevent spreading. In the discussion which followed, Mr. H. Shipard favored brush sheds because iron attracted the heat during the summer, and caused the wheels of the implements to become loose. Mr. Starkey favored iron sheds for water conservation. Mr. Lynch thought that sheds should be only about 16ft. wide, because the rain was more liable to go through a wide shed. Mr. A. P. Rowen said iron sheds improved the appearance of the farm more than those constructed with brush. The President (Mr. J. A. Dodgson) then gave an interesting account of his travels in Egypt.

COLTON (Average annual rainfall, 17.01in.).
June 29th.

THE MOUSE PEST.—In the course of a paper dealing with this subject, Mr. M. Kenny cited instances of mice ruining large stacks of hay, particularly during the year 1915. During the season 1921-22 he grew a very good crop of oats on his farm, and to protect the hay from the ravages of the mice he erected a structure of the following dimensions and material:—A row of seven posts each 1ft. 9in. above the level of the ground and 4ft. apart was set out to form the sides of the structure, the width between the corner posts being 15ft. Three similar rows of posts were placed between the two outside rows, but those posts in the middle were not placed firmly in the ground. Kerosine tins, the bottoms of which had been cut out, were placed on the top of the posts. Sixteen feet lengths of 3in. by 2in. stringy bark were placed on top of the tins and nailed down. A floor of rough timbers was made and upon that 25 tons of hay were stacked. Mr. Kenny stated that he was at present using the hay and there were no signs of mice having been through the stack. In stacking grain it was a good plan to leave small spaces between the bags so that cats could crawl through the stack and destroy the mice.

GREEN PATCH (Average annual rainfall, 26.56in.).

June 25th.—Present: seven members and 10 visitors.

PRUNING.—Mr. Whillas contributed a short paper dealing with this subject. The objects of pruning, he said, were to increase the quality and size of the fruit, to make the trees bear regular crops, to remove injured, worn out, and dead wood, and to assist in the formation of the tree. Pruning was generally carried out with the idea of training the tree to grow in the shape of an inverted cone, so that the centre would be kept open to admit sunlight and air. Provision should be made, however, for lateral growth in the centre, to provide shade for the main and secondary arms, otherwise the bark on the tops of the arms would be injured by the sun. All tools should be sharpened and cleaned before being used for pruning. The vigor of a tree depended very largely upon the growth of leaves, because these were the breathing organs of the plant. The nearer a shoot approached a vertical position, the stronger would be the growth, whilst the reverse applied to a shoot making a horizontal growth. The sap flowed most freely to the highest point of each shoot. A tree that was not making very much growth was more likely to set and mature fruit than a young tree that was making a lot of growth. To check the growth of young trees after they had the required number of leaders, and to make them throw out spurs, it was a good plan to allow the leaders to go unpruned for a year. After they had spurred, they should be shortened back, otherwise they would bear fruit near the top of the tree and cause the limbs to break off, thereby spoiling the shape of the tree, and the loss of some of the leaders. Once the leaders were formed, they could be kept intact and there would be no further branching nor formation of forks.

MALTEE.

June 22nd.—Present: 12 members and two visitors.

FALLOWING OPERATIONS.—In the course of a discussion on this subject Mr. J. Shorne expressed the opinion that fallowing operations should be commenced immediately after seeding, provided the rubbish had made a good growth. Mr. Edson inquired whether the disc plough could be used for fallowing. Several members spoke on the question and stated that such a plough could be worked with advantage. In regard to the question as to the most suitable depth at which to work the land, Mr. Martin favored ploughing the soil 3in. deep. Mr. Bassham considered 4in. the best depth, while Mr. C. Schwarz said that the land in their district should not be ploughed to a greater depth than 3in. Mr. J. H. Will said he would not work the land in the Maltee district more than 2in. in depth, during both ploughing and cultivating operations. Members favored the spring-toothed and the scarifier type of implement for keeping the weeds in

check on the fallow. To prevent the fallow from drifting, they advised leaving strips of uncultivated land through the centre and around the sides of the paddocks. It was also considered that strips of land could be sown with oats or barley, and these could be fed off or cut for hay, and would assist in preventing the soil from shifting.

MILTALIE (Average annual rainfall, 14.55in.).

June 23rd.—Present: four members.

DESTROYING FOXES.—The monthly meeting of the Branch was held at Mr. J. P. Story's homestead, and took the form of a "Question Box." After the various well-known and approved methods of poisoning foxes had been discussed, a member described a method of trapping foxes that would not take baits:—"First bury any carcass which is at hand in a place that is likely to be visited by foxes. Then set two or more traps, which should not be secured to the ground, but weighted with old ploughshares, on either side of the buried carcass. The decoy should not be buried too deeply, because it is the habit of the fox to scratch away the earth from any carcass which they can smell."

ROBERTS AND VERRAN.

June 28th.—Present: seven members and one visitor.

CARE OF IMPLEMENTS AND MACHINERY.—In a paper on this subject, Mr. H. Lewis said that a shed should be provided for all the machines on the farm. He would also have the implements painted in order to preserve the wood and iron. They should be well oiled, and the threads of the bolts should also be oiled to prevent rust. The nuts would then unscrew easily when required. Breakages should be attended to immediately they were noticed. By prompt attention, serious injury, and perhaps complete breakdown might be avoided. Wagon wheels, etc., could be preserved during the hot weather by coating them with raw linseed oil. That would not only preserve the timber in the wheels, but would also prevent the spokes loosening. If those and similar methods were adopted on a farm, there would be a great saving of both expense and trouble. In the discussion which followed, Mr. H. Simmons said that implements should be protected from the weather; he would also keep the bolts greased to prevent them rusting. The machines should be repaired as soon as possible after breakages occurred. Mr. B. Evans also thought a shed was a necessity. He would prop up the ends of the stripper and harvester combs when not in use to prevent them sagging. The binder canvasses should be rolled up and hung where mice could not reach them. Painting also preserved the woodwork. Mr. M. Masters thought the open part of the shed should face the south-east. When time could not be spared for painting all the implements, he thought it would be a good plan to dab paint over the nuts to prevent them rusting.

SMOKY BAY (Average annual rainfall, 13.06in.).

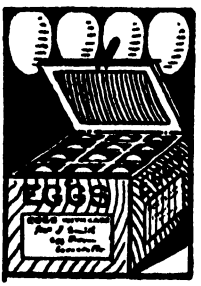
May 26th.—Present: seven members.

Mr. L. L. Barlow contributed a paper entitled "Some Experiences in Tank Construction." He preferred rocks as a natural run when they were available, but that would entail a great amount of work in clearing. He thought the most economical method was to plough the land deeply at first and then clear it with a scoop. He had found that swamp clay was an excellent substitute for mortar, but it entailed more work in mixing. He said lime was liable to fret when used as mortar. In building, the face of the wall was left as open as possible, and then flushed up with sand and cement in the proportion of six to one; it was then finished off with the usual coat of cement. Swamp clay had also proved satisfactory as a water run; it should be mixed up when very wet and put on a bed of cracked stones and then rammed down and tarred or cemented over. A good discussion followed the reading of the paper.

NINE TIMES AS MANY EGGS!

Thanks to KARSWOOD POULTRY SPICE (Containing ground insects).

NEW laid eggs are selling readily these days, at fancy prices—a golden opportunity for backyard poultry keepers whose hens are laying well. Are *your* hens laying, or are they still parlor boarders? Eating with alacrity all the scraps and feed you give them,



but, in return, doing no more than lay an occasional egg. If so, then the remedy is easy to apply, and costs you no more than a half-penny a day for every 12 fowls. Here we publish a letter from an English user of Karswood Spice (containing ground insects), which gives practical proof of the value of Karswood during a period when eggs are not plentiful. Karswood works naturally on the birds. It cannot "force," and is guaranteed to contain no injurious ingredients. Read the letter below and decide to make a start yourself.

NINE TIMES AS MANY EGGS

"Edwards Cottage,
North Somerootes, Lincs.

I feel I must write and tell you the result, in my case, of using your Karswood Poultry Spice for my birds. From 35 hens for the month of October, 1921, I got 31 eggs without Karswood Poultry Spice. Last month, from 32 birds, the same ones, using Karswood Spice, I got 278 eggs. Last November, without Karswood Spice, four eggs for the month: for four days of this month, 36 eggs. You can use this as it pleases you. I got the Karswood Poultry Spice from Mr. Armstrong of this village.

W. L. SAUNDERS.

November 4th, 1922."

There is the proof. You can do just as well with your own backyard hens, and the cost is only ½d. a day for every 12 birds.

NOTE THE ECONOMY.

1s. packet	supplies 20 hens	16 days.
2s. packet	supplies 20 hens	32 days.
13s. tin (7lbs.)	supplies 140 hens	32 days.
14lbs. tins, 25s.	28lbs. tins, 48s.	

COSTS ½d. A DAY TO MAKE 12 HENS LAY.

Ask your storekeeper or produce dealer to supply you with a 1s. packet of KARSWOOD POULTRY SPICE and try it for a fortnight on half a dozen hens. Results are not instantaneous—it takes a fortnight or three weeks to produce results—for Karswood works naturally and not suddenly.

If your local dealer cannot supply you, drop a postcard to the agents for your State, who will put you in touch with your nearest supplier.

AGENTS FOR SOUTH AUSTRALIA,

S. C. EYLES & Co,

CURRIE ST., ADELAIDE.

NOTE: If supplied by Agents direct, postage must be added to cost.

KARSWOOD POULTRY SPICE.

GUARANTEED NOT TO FORCE THE BIRDS.

WIRRULLA.

June 23rd.—Present: 17 members and visitors.

FALLOWING.—Mr. J. M. Souter, who contributed a paper dealing with this subject, expressed the opinion that much of the success that a settler made at farming could be attributed to the manner in which the land was fallowed. It had been the usual practice of most of the farmers in that district to crop the stubble land, but he believed that under present conditions it would be more profitable to graze stock on those paddocks that had been cropped successively for two or three years. When cropping stubble land, one could not depend on the moisture that had been stored in the soil during the previous year, but in most cases a profitable crop could be grown on good fallow land if the subsoil was in the right condition. Fallowing, to obtain the best results, should, in most instances, be commenced immediately after seeding, and be completed by the end of August. For that district he advocated working the land to a depth of 3in. to 4in. Where a farmer had sheep, it was a good plan to run the flock on the fallow to keep the weeds in check. If the land was very wet during fallowing, 50 to 100 acres should be ploughed, and if the weeds were making a strong growth the plough should be stopped, and a set of harrows or a spring cultivator should be run over the land to kill the weeds. The spring-toothed cultivator should be worked in the spring to destroy the weeds on the fallow and to assist in the preparation of the seedbed. The harrows should be worked after every fall of rain to help the soil to retain the moisture. Prior to the sowing of the seed, the land should be worked with the cultivator to a depth of about 1in. to 1½in. to form a good seedbed. After the drilling was completed the land could be finally worked with the harrows.

YADNARIE (Average annual rainfall, 14.09in.).

June 26th.—Present: 15 members.

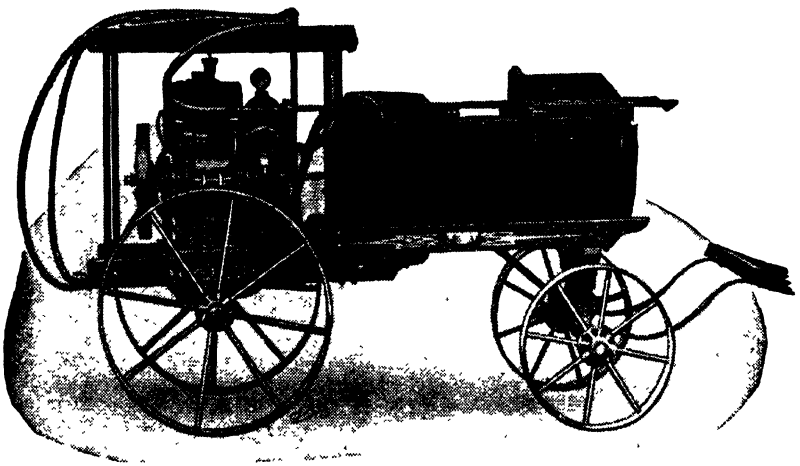
THE ADVANTAGES OF THE COMBINE OVER THE DRILL AND CULTIVATOR.—In a paper on this subject, Mr. E. J. Dolling said he wished to point out the advantages of the combine as a time and money saver for the farmer. The price paid for a 16-row combine was about £100, and the machine could be worked with eight horses over almost any class of soil in that district. A 9ft. spring-tyne cultivator would cost about £50 and would require seven horses to work it. A 16-row drill would cost approximately £75 or £80, and would require four horses. The total cost of the drill and cultivator would be from £125 to £130, therefore there would be a saving of £25 or £30, besides one driver and three extra horses. Other advantages were that the seed was sown on a better seedbed, and was more evenly distributed, also there was not so much space left between the rows for weeds to thrive. He was of the opinion that if a farmer once used the combine he would not go back to the drill. The combine was provided with a forecarriage, therefore there was no weight on the necks of the horses, and the collars were not damaged as with the poles of an ordinary drill. He found the best way was to drill round and round the paddock; no time would then be wasted turning corners. As the machine could be put out of gear whilst working, the corners would not have to be drilled twice. During the discussion, Mr. W. E. Hier thought it would not pay the farmer to scrap his drill and cultivator and purchase a combine, but if he had the choice he would certainly buy the latter. He thought the drill could be provided with a forecarriage with advantage. Mr. J. J. Deer said the combine was an efficient implement on good land, but took the place of a hoe-drill only, and that implement would work better than a combine in large stumpy country. He was not in favor of a forecarriage on the drill. Mr. E. J. Richardson observed that when a combine was used, the wheat was sown quickly, and received all the winter rains. Mr. O. Forbes said the combine was an advantage over the drill where the land had been prepared for the drill and heavy rains fell before drilling was completed. He was of the opinion the implement was not a success in new mallee country, and it would not pay the farmer to have one for working the fallow only. Mr. P. J. Dolling considered a combine would work where a hoe-drill would not, because the clearance was greater, and the tynes, on going over the stumps, loosened the rubbish, whereas the hoe-drill was likely to drag it

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along. He did not consider it a good implement for new mallee land, but it spread the seed well on fallow land. He had gone over 400 acres with his combine and had broken only one tyne. He used a set of trailers behind the combine. Mr. F. W. Jericho had worked a combined implement successfully during last seeding, and he thought it would work well on new mallee land if the front row of tynes were raised. The Hon. Secretary (Mr. A. Jericho) said he was not favorably impressed with a forecarriage on a drill.

YEELANNA.

July 21st.—Present: 10 members and two visitors.

GERMINATION TESTS.—Mr. R. Wemyss reported having conducted the following germination tests with small quantities of grain:—Unpickled wheat gave a germination of 83.5 per cent. Wheat turned over on the floor three times with a shovel in a 1 per cent. solution of bluestone gave a germination of 75 per cent. Wheat hung in a bag in a 1 per cent. solution of bluestone for the same time as it took to turn the wheat pickled on the floor gave a germination of 82 per cent. A long and keen discussion followed.

GREEN PATCH, July 23rd.—The meeting discussed the increased fares and freights between Port Adelaide and Port Lincoln. The Hon. Secretary (Mr. R. L. C. Sinclair) presented the annual report, and the officers were elected for the forthcoming year.

LIPSON, June 23rd.—Mr. E. J. Barraud delivered an interesting address, "The Tractor *versus* Horses," and a keen discussion followed, in which each member present took part. The delegates to the Annual Congress were also appointed.

MOUNT HOPE, April 28th.—A paper, entitled "What a Child can Learn from a Well Arranged School Garden," was read by Mr. V. Wiadrowski. He dealt with the subject first from the point of view of the nature of the undertaking in the garden, and secondly, the education which a child would secure from these operations. Starting with the seed bed, he discussed its structure, enumerated the plants which should constitute the garden, and described the operations of budding, grafting, cincturing, and pruning. The cross-fertilisation of plants, such as poppies, was suggested as likely to be of particular interest to school children. An interesting discussion followed, in the course of which it was suggested that the paper might, with advantage, be read before the local school children.

YEELANNA, June 23rd.—Present: 10 members and three visitors.—The monthly meeting of the Branch took the form of a question box. One member asked for information respecting the best month for lambs to be dropped. The general opinion was that May was the best month. In answer to another question, members thought that Canaan would be the best variety of wheat to sow on new land in that district. The officers for the ensuing 12 months were then elected.

TALIA, June 16th.—Various matters of interest were discussed before a large attendance of members.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

BLOCK E.

June 26th.—Present: 21 members.

BUDDING AND GRAFTING.—In the course of a paper dealing with this subject, Mr. W. E. Ashenden said budding should be performed when the sap in the tree was flowing strongly. The bark of the tree should lift easily on being

raised, and the sap should follow the incision made with the knife. A sharp knife was most necessary, and a bone or wooden blade should be used for raising the bark. Only mature buds should be used, and these should be selected from approved stocks. It was important to bind the cut in order to exclude air and water, but care should be exercised not to cover the bud. Grafting should be performed in a careful manner, great care being taken to see that the inner bark or scion and stock united, otherwise the graft would not "take." Grafting wax was to be preferred to clay, because the former was waterproof and did not crack. The following recipe for making grafting wax was supplied by Mr. Ashenden:—Melt in a tin over a stove, not over an open fire, 1½lbs. beef dripping without salt, add 2lbs. of beeswax that has been cut into small pieces; stir well and add 1lb. of powdered resin. Boil the mixture for half an hour. The wax if properly made should "work up" in the hands and keep for an indefinite period.

KI KI.

May 26th.—Present: five members.

THE WORKING MAN'S BLOCK.—In the course of a paper under the title, "The Possibilities of the District for the Laborer to Make a Home and a Living," Mr. L. Angus suggested that the man working for an employer should make an application to the Land Board for a block of land containing about 20 acres to 40 acres on the sandy slopes overlooking the township of Ki Ki. Any time that the laborer had at his own disposal he could be engaged on his own piece of land grubbing and preparing about 10 acres of the block for the cultivation of fruit trees and vines. A site should be selected for the house, and the stone for building could be taken off the block and carted ready for the building. The remaining area of land could be sown with a crop of hay for feed for the horse which would be necessary to cultivate the garden. Mr. Angus thought the grapes could be dried or syrup manufactured from them, for he believed the time was not far distant when grape syrup would take the place of sugar.

LAMEROO (Average annual rainfall, 16.55in.).

May 26th.—Present: 15 members.

UTILITY POULTRY.—The following paper was contributed by Mr. W. Kriewaldt:—"To make this paper as interesting and instructive as possible I shall first of all endeavor to show whether poultry, as a side line, can be raised profitably on a farm. The most simple way to do this will be to quote from the records of my flock. The following is a record of 100 pullets—White Leghorns that were hatched during the month of September. These pullets commenced to lay in February. The cost of rearing these pullets, figuring all food consumed at its market value, was 4s. per bird, making a total of £20. From

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February, 1922, to February, 1923, these hens cost £35 more in feed, lime, shell-grit, &c. This makes a total of £55 expended to rear and feed pullets for one year after commencing to lay. The profits derived from these birds were as follows:—1,700 dozen eggs at an average of 1s. 3d. per doz., amounting to a total of £106 5s. This leaves a net profit of £51 5s. for the 100 hens. The time expended to care for these birds was about half an hour each day. These figures, I think, prove conclusively that the hens paid, and paid well for the labor and trouble spent on them. One of the main points in the successful rearing of the birds is to start off with a good laying strain of one of the recognised utility breeds. First and foremost amongst these, ranks the White Leghorn, with the Black Orpington, Brown Leghorn, and Red Sussex following close behind. The Black Orpington and Red Sussex have the added advantage of being excellent table birds. There are several ways in which a beginner can make a start with pure-bred poultry. The best plan for the farmer, who already has some poultry, would be to buy settings from some reliable breeder. Later on, if he feels so inclined, he could pen up the pullets reared on the farm with a good cockerel of the same breed, and so form a good breeding pen. In this manner he could gradually cull out the mongrels and breed up a flock of pure-bred birds. There are two methods a farmer can use to hatch out chickens, namely, with a broody hen or with an incubator. If he only desires to keep a flock of 150 to 200 hens, the broody hen would be the simpler method. But any number over this would require an incubator and a brooder. The hot air incubators are the most commonly used. These are just as efficient as the hot water incubators, but require more constant and skilful attention. I would advise buying a large machine, not less than a 200-egg capacity. The reasons for this are as follows:—1. You can hatch out all chickens at the right time. That means here during the month of September. At that time the roughest winter weather is over, but there is still plenty of green grass, which is one of the most essential foods to promote growth and early maturity. 2. The chickens during the first week need a great deal of care and attention, and so, by having them all out at the same time, this would only need to be given once. While one is caring for them it is just as easy to care for 500 as for 20. 3. The larger machines take much less fuel in proportion to heat them. When we add to this the fact that a large machine needs no more care or attention than a small one, the advantages of a large machine are apparent. The correct temperature at which to run an incubator is 101deg. the first week, 102deg. the second week, and 103deg. the third week. If the chickens commence to hatch out on the evening of the twentieth day it can be taken that the mean temperature has been correct. One of the main difficulties with incubators, especially in this district, is the moisture problem. The only advice I can give on this point is to follow the directions of the incubator manufacturers as closely as possible, but instead of beginning with the moisture as directed, start two or three days earlier, because this climate has a tendency to dry out the eggs more rapidly than usually happens in other parts of the world. It is often a good plan, when one notices that the eggs are chipping, to sprinkle them with luke-warm water, taking care, however, to do this quickly in order not to chill the eggs. Then the flame should be turned up a little higher, because the water will cause the temperature in the incubator to drop. Very soon the temperature will go up to about 104deg. or 105deg. F. and this will cause the warm air to take up the moisture on the eggs and commence circulation. The lining and shell of the egg are softened by this moist air, and the chickens are enabled to break through more easily and without sticking to the shell. After the chickens are hatched they should have no feed for 24 hours. After this some flaked oats, bread crumbs, and the hard-boiled yolk of an egg can be given to them. This should constitute the feed for the first week. After that they can be given crushed wheat and other crushed cereals. They need constant care during the first week, but after that, if they have a run of their own where they can be fed, they practically take care of themselves, if the weather is fine. If the brooder is put into the run, the chickens soon learn to go in and get warmed up after being out for a while. The sexes should be separated as soon as one can distinguish them. It is a good plan to pen up the cockerels and get them ready for market as soon as possible. If they are of a light breed it will not pay to keep them more than three to four months, because, as I mentioned before,

it costs 4s. to feed them until five months of age. The prices for them usually range from 3s. to 4s. so they are often raised at a loss. Many of the commercial poultry breeders kill the cockerels as soon as they can be distinguished. There are two different methods of feeding adopted by the leading poultry men, namely, the dry mash and the wet mash. The simpler, and more suitable for a farmer is the dry mash system. In this system all the mash is prepared some weeks ahead, and the hens can help themselves. The following is a mash that is being used by many poultry farmers:—100lbs. of bran, 200lbs. of pollard, ½lb. of salt, added to this bone-meal and blood-meal or meat-meal. The last named article I have always given more or less according to the time of the year. This should all be mixed thoroughly and placed in a dry hopper, arranged so that the birds can help themselves. They are not sufficiently fond of it to gorge themselves, but will eat it if they cannot find enough other food. In this way one need not be afraid of under or over feeding. In the wet mash system, the same feeds are fed, but they have to be mixed fresh daily, and as the hens are very fond of the wet mash, there is a danger of over-feeding them and getting them too fat. Especially is this the case with the heavy breeds. In conclusion, I would like to say that in my opinion a good hen, well taken care of, will make a profit that will compare favorably with any one of our farming operations."

LOXTON (Average annual rainfall, 12in. to 13in.).

May 31st.

CITRUS CULTURE.—In the course of a paper dealing with the care of citrus trees from the time of planting up to the third year of growth in the orchard, Mr. S. V. Fuller first gave a brief outline of the history and peculiarities of the citrus family. The paper then read as follows:—"The citrus family is a most hardy and long living one, provided conditions are not altogether uncongenial, and will respond quickly and readily to good treatment. The trees are able to withstand great heat, and a few degrees of frost without damage. Citrus trees are particular in one respect; they will not stand cold wet feet, they must have good drainage, or an ideal soil consisting of a strong sandy loam with a gravelly or open subsoil. It is surprising how well oranges will do in a naturally poor soil, provided they have fair treatment and good drainage. The wants of this family are peculiar, and to some extent different from those of other fruits, and I believe failure in orange culture in many cases, is not so much due to effects of soil and climate, as carelessness or ignorance in the management of the trees. I consider the planter should consider carefully the following eight points in order to bring about good results:—(1) Suitable climate and soil; (2) proper preparation of the soil; (3) correct stock trees worked on and procured from healthy selected stock; (4) a regular supply of congenial food; (5) water supply during periods of drought; (6) to disturb the roots as little as possible; (7) to keep the ground free from weeds and undergrowth; (8) shelter from strong winds. Assuming the intending planter has found a suitable spot, and paid due attention to soil preparation (by this I mean land to be well broken up by means of a plough and subsoiler to a depth of 18in. to 20in. if possible), the next point to be observed is the selection of the trees. Naturally these should be of a robust, healthy appearance, and of a good dark green color, but particular care must be paid to the stock on which the plant is to be budded. There are a number of stocks that the orange family can be worked on, such as citronella, seedling orange, Seville, and citrus trifoliata, and others. Of these citronella and seedling orange are to be preferred. In these parts, and in fact anywhere in the Murray Valley suitable for orange culture, I certainly give citronella first place, because it is undoubtedly hardier, and also brings the tree to maturity more quickly. Citronella must have good drainage, and although I have seen it doing apparently well in heavy soils on the Adelaide plains, it does not live long, and occasionally a tree will go off suddenly at an early age, on cold soils with indifferent drainage. Seedling orange is undoubtedly a good stock and one which grows better on cold sticky soils than citronella, but it is slow, and given

the advantage of the good drainage we have in these parts, why not use the citronella in preference. Next comes the planting. There are two planting seasons, before and after winter; never attempt to shift oranges during cold or wet weather. When trees are planted in the autumn, there is a certain amount of warmth in the ground, root action begins quickly, plants revive after removal, and become firmly established before the advancement of winter, and, further, these trees are in a good position to stand up to the first hot spell in the coming summer. I may state here that although, generally, autumn planting is advantageous, yet it does occur sometimes that a late summer causes a late hardening of the young plant which renders it somewhat too tender for removal. Inquiries as to this should be made from the nurseryman, and if necessary, planting would be better left until the forthcoming September. On receipt of plants from the nursery, water them well over the leaves before removing them from the case. Plant at once if possible, but if not, place the trees in a shed sheltered from the wind until a more convenient time. Great care must be taken to avoid damage to the young fibrous roots. These are all wanted, and neither must they be exposed to the air longer than is absolutely necessary. Choose if possible, a moist or dull day for planting. Be careful not to plant the young trees too deeply. In some soils, this is a fruitful cause of a disease known as collar rot. Remove one-half of the growth on the trees at the time of planting, the young roots cannot support so much at that time. Oranges and lemons should be planted from 20ft. to 24ft. apart each way. The Mandarin or Tangerine section being less robust in habit is spaced from 15ft. to 18ft. apart. After the trees have been planted, the soil must be kept thoroughly cultivated, weeds kept down, and regularly worked for the first year. The usual periods of irrigations which hold good in irrigation settlements are too far apart, and during a hot spell, young trees suffer from drought before the next water supply comes along. In this case use must be made of the water cart. Young trees allowed to become over dry are in danger of becoming sunburnt and bark bound, which materially affects their future, if indeed it does not ruin them altogether. Citrus fruits have greater requirements than many other fruits in the way of manures, because they practically have no rest period. No sooner is one crop off than another is on the way, and so they are working all the time. For the first two years, the manures applied should be placed fairly close to the trees. After the trees are two years old, the manure can be either drilled or broadcasted down the rows. Superphosphate and bone dust are both excellent manures for young citrus trees, or a mixture of the two may be used. Dressings of 2cwts. to 3cwts. per acre are sufficient up to two to three year old trees. Apply bone dust in autumn, superphosphate in spring, and cultivate immediately afterwards. An important point with newly planted trees is that of making a light mulch around the tree. This keeps off the direct rays of the sun, and retains the moisture for a much longer period. Stable manure, grass, or old straw can be used for this purpose. Stable manure, of course, brings best results because it adds a certain amount of nutriment to the soil. At the end of the first year the appearance of the young tree will be more or less a bunch of short shoots from 12in. to 18in. long. Nothing very definite can be done at this stage in the way of pruning, but at the end of the third year, providing the tree has had fair treatment, many of the shoots should be anything from 2ft. to 5ft. in length, and from these the future tree has to be framed. Select three strong shoots growing away in opposite directions if possible. These are to be the first mains, all other shoots must be cut back close into the stem, but do not entirely remove the leaves on the small remaining portion, because these help to provide shade from the sun. The heads of citrus trees should always be trained low, so as to provide shade for the stems. These first main limbs must not be lost sight of, although it will be found that in after years, other mains will introduce themselves higher up as the tree grows, but with a definite framework to start on from the first set, it will be found much easier and more convenient to arrange those that come after in their proper places. In conclusion, I must allude to one point, that is never work a plough in the orangery after the second year. You cannot plough without injury to the roots. All the most important roots of the orange are close to the surface, and if the plough is worked damage must be caused, which is bound to have its effect on the young trees."

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MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

June 23rd.—Present: 15 members.

CLEANING AND WORKING NEW LAND.—Mr. E. Hartmann, in a paper on this subject, said that the first work to be done on new land was breaking down the scrub, and that could best be performed with a scrub roller and six horses. The rolling should be carried out during October or November, in order to allow the timber to become thoroughly dry for burning. The best time for burning, he thought, was during the end of February. Ploughing could then be commenced. Oats would be the best first crop to sow on sandy soil; one would then be more likely to get enough stubble for a good burn the next year to destroy as many of the shoots as possible. During the second season the land should be sown again, with 100lbs. of manure to the acre. After the crop had been taken off, the stock could be kept on the land for some time to knock down the straw in preparation for another burn. The land should then be left for two years without cropping. During the discussion which followed, some of the members thought that the most effective method of clearing shoots from new land was to crop it for four years in succession. The last crop would be a poor one, but the practice would pay by assisting to clear the land. One member said he would crop three times, twice with oats and then with wheat. He said he could get the best stubble burns from oats. Mr. Hartmann would plough new land 1½in. to 2in. deep.

MOOROOK.

June 29th.—Present: 11 members and visitors.

VINE DISEASES.—A paper dealing with the subject, "Vine Diseases," was contributed by Mr. S. Sanders and read by the Hon. Secretary (Mr. E. A. Liddicoat). The paper dealt chiefly with the ways of detecting and treating black spot and oidium, and the writer laid stress on the importance of timely and effective applications of fungicides. For oidium, two dustings of sulphur were usually sufficient to check the disease. These should be given just prior to the flowering of the vines and during fine weather. For black spot the writer preferred an acid-iron mixture for a winter treatment, thorough applications being absolutely necessary to deal effectively with the disease.

MURRAY BRIDGE.

May 16th.—Present: 20 members and visitors.

IS LUCERNE THE MOST PROFITABLE CROP THAT CAN BE GROWN ON LOCAL SWAMP LANDS?—The meeting took the form of a debate on this question. Mr. J. G. Kuchel, in speaking for the affirmative, said that lucerne had long been recognised as the king of fodders, and he believed that it would long continue to be so recognised on account of its great value as a fodder. Lucerne was a great protein producer. It could be reckoned that a crop of lucerne would give 10 tons of green fodder per acre. Other fodders would only give two crops per annum at most, whereas five cuts of lucerne could readily be obtained, thus the lucerne would give a much higher value of protein. The speaker considered the cost of establishing a stand of lucerne would be about 11s. 8d. per acre. Most other crops would cost more. Mr. F. Hannaford, leading the negative side, said it was a good thing to have a little lucerne, but not at the expense of pushing out all other crops. A very necessary thing in dairy farming was a balanced ration. Lucerne was practically done in March, and maize was a crop that was cheap to grow on reclaimed swamp land, and would give yields up to 40 tons per acre where the conditions were suitable. For winter feeding berseem had proved a splendid fodder, and with maize in summer, would give both variety and quantity. Also oats and tares or oats and peas gave good results, and should be more generally grown. Lucerne should be kept, but a rotation of crops was most important. Moreover, lucerne should be cut in the cool of the morning or evening to prevent loss of leaves in hot weather, which meant

much labor at an inconvenient time. Mr. E. Nelson, the second speaker for the affirmative, said the low state of the river and the salinity of the water frequently made irrigation in autumn very difficult, so that it was often impossible to get berseem sufficiently early. By sowing rotation crops late in winter, the summer crop would be made late, i.e., the maize would have to be sown in November. Moreover, rotation cropping tended to induce the growth of weeds. It was often found that the wild millet choked out Japanese millet. Also the rotation of crops tended to exhaust the soil much more than did lucerne. The surplus lucerne of summer could easily be conserved for winter, and the lucerne paddocks could be grazed at the same time, thus giving green and dry fodder at the same time, a fact which could not be said for any other fodder. Mr. Fletcher, for the negative, said lucerne was good, but more variety was needed, and it was nearly always possible to irrigate in autumn and start the rotation crop. The wild millet trouble could be overcome by good cultivation, and 3 or 4 tons of good oaten hay could be grown per acre in winter. Moreover, too much lucerne tainted the dairy produce, and was wasted if fed alone in excessive quantities to cattle. Also other crops could be grown on the swamp lands, which did not depend on the dairying industry. Mr. J. Lehmann, for the affirmative, said lucerne was not an expensive crop to grow, and that its value per acre could be reckoned as £16 worth of cut lucerne and £3 worth of grazing, equalling £19 value per acre, from a cost per acre of 11s. 8d. to establish. He considered that maize on the same reckoning would be about £2 9s. per acre, because he considered that maize gave much lower results than were quoted by the opponents. He maintained that on a protein basis a ton of maize would be worth 2s., while a ton of lucerne would be worth 7s. 6d. Mr. A R. Hilton, for the negative, said it was a mistake, as the negative side had said, that dairying was the only or most important form of industry to which the swamp lands could be put. Analysis had shown that the soil was similar to the rich land of the valley of the Nile, which would grow cotton and many other valuable crops. It had been proved by a member of their Branch that fruit could be grown profitably on the swamp lands. The trees bore regular and heavy crops of fruit of an excellent quality, and many blockers were making a success of vegetable culture. As population increased the swamp lands could be made to support a large number of people, and produce much more revenue than would be the case if the swamps were restricted to dairying and lucerne growing.

PARILLA (Average annual rainfall, 16in. to 17in.).

April 24th.—Present: eight members.

COMBINED DRILL AND CULTIVATOR v. SEPARATE IMPLEMENTS.—In the course of a short paper dealing with this subject, Mr. J. A. Mann said many advantages could be claimed by the combine over the separate implements. In the first place there was that of cost. A 25-hoe drill cost £90, and a 12ft. cut cultivator £65, or £155 for the two implements. A combine could be purchased for £120, which meant a saving of £35. One man was able to operate the combine, and 25 acres of land could be covered each day without any difficulty. The speaker contended that with the combine, the seed and fertilizer were placed on a better seed bed than was the case with the separate implements. Again, with the combine, the fallow could be worked back without the assistance of any other implement, and as a weed killer, he knew of no better machine, provided the land was cleared of roots and bushes. Mr. Mann stated that in the Wimmera districts of Victoria, the combine was a most popular implement and many of the farmers in that district used the machine to do their summer fallowing. The paper provoked a good discussion and opinion was fairly evenly divided for and against the combine.

THE BRIDLE v. THE SPRING DRAUGHT PLOUGH.—Mr. A. W. Welden, who read a short paper dealing with this subject, expressed the opinion that the spring draught was very superior to the bridle draught on ploughs. In the first place the spring draught gave a greater land clearance, which permitted stumps and bushes to pass through the plough unhindered. The springs also relieved the jarring on the shoulders of the horses, and the plough bodies would jump without

causing the chains to tighten. The spring plough would also work land which a bridle plough would not cultivate. The wear and tear on the springs and other fittings would in all probability be more expensive than the wear and tear on bridles, but if the farmer wanted to root the stumps out of the land, the spring draught implement would do the job just as well as the bridle draught plough. An interesting discussion followed in which the majority of members favored the spring draught plough.

PARILLA (Average annual rainfall, 16in. to 17in.).

June 22nd.—Present: eight members and two visitors.

FALLOWING.—The following paper was contributed by the Hon. Secretary (Mr. C. S. Foale):—"The practice of fallowing is becoming more and more generally adopted, because it is now more fully recognised that a crop grown on fallow yields heavier returns than one grown on grass or stubble land. To grow heavy crops, it is necesary to build up the soil; this we do, not only by the application of fertilisers, but also by fallowing. During the fallow period, the land apparently lies dormant, but it is really working under the influence of the sun and atmosphere to store up plant foods, and it is also storing moisture for the subsequent crop. This storing of moisture is probably the most important action of fallow, for without moisture the plant foods, natural or artificial, cannot be made available to the crop. Fallowing, therefore, is a form of water conservation—as well as a soil improver—by which the rainfall of two years is made available to one crop. The chief points to be considered in relation to fallowing are how and when it should be done. The first of these points may be passed over briefly as the general rule is to use a share plough where the land is clean, or a disc where there is rubbish or bushes. The depth of ploughing comes under this heading, and may raise a debatable point, because some farmers favor deep ploughing, others shallow. The chief consideration is that the soil be completely and evenly cut and turned right over, thus burying the grass and weeds which will then soon become decomposed. An average depth of from 2½in. to 3in. is quite sufficient. In this country it is rather dangerous to go much deeper, because too much clay is brought to the surface. The better practice, if deep ploughing is desired, is to increase the depth slightly each time of ploughing, but it has yet to be proved whether deep ploughing is an advantage in our district. When to fallow is a very important point, and one on which there is some difference of opinion, but it is now becoming the recognised thing to fallow as early as possible after seeding. When this is done weeds are ploughed under before they have obtained a firm root-hold in the soil and before they have used up the plant food required for the next crop. June fallowing is preferable if at all possible, but anything later than August is, as a rule, of very little use. Summer fallowing is fast coming into vogue, and in districts where it has been practised for some years past, such as the western districts of Victoria, and in our own district to a limited extent, it has been proved that summer fallow yields a heavier crop than even early winter fallow. February and March are the periods during which summer fallowing is done. The land, although dry, ploughs up well when good sharp shares are used. Land that has been out for a year ploughs more readily than stubble land. Of course the job is a dusty one, but it is worth that disadvantage, and is also worth the further disadvantage of wearing out a few sets of shares. Immediately seeding is over the summer fallow should be harrowed. This will give a fine level surface, and clods that may have been turned up can easily be broken, because they are damp. The cultivator should now be brought into work which will destroy all weeds that germinated whilst seeding was in progress. Fallowing is the surest and most up-to-date method of preparing to grow a good crop, and it is to be hoped that farmers will fully recognise this fact, so that in the not far distant future, all the wheat crops of the State will be grown on well worked fallow, thus greatly increasing the present low average yield. We will be forced to increase the average yield to make wheat-growing pay, for the high price for wheat of the past few years will not, on present indications, be maintained in the future."

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PARILLA WELL (Average annual rainfall, 16in. to 17in.).

June 25th.—Present: 14 members and three visitors.

QUESTION BOX.—Mr. Slater asked the members if they thought it advisable to feed off a forward wheat crop. Members thought it might be an advantage on new land, but with the present methods of fallow and seeding after rain with a variety of wheat to suit the time of sowing that would not be necessary, nor would it be advisable. Mr. Mitchell asked, "Is it advisable, when fallowing, to plough sand hills deep or shallow?" Mr. J. W. Johnston replied that sand hills should be ploughed as shallow as possible. In answer to the question, "Would it pay to have an expert in our district to class small flocks of sheep, and advise on the class of rams to use?" by Mr. J. E. Johnston, the members thought that more should be done by farmers to improve their flocks by culling and getting sheep more of one class. It would then probably pay to procure an expert.

PATA.

June 27th.—Present: nine members.

CORRECT TIME FOR SEEDING ON THE MURRAY LANDS.—The Hon. Secretary (Mr. L. R. Best) contributed a paper on this subject. He thought it was generally agreed in that district that early sowing was the best. Good crops had been secured from seed sown as late as August, but as a general rule that practice would be disastrous. The average yield for the county of Alfred during the last seven years was a little under 9bush. per acre, and that period included two exceptionally good years. He thought the average crop could and should be raised to 15bush. per acre. He knew of scrub country in the lower north which was inferior to the quality of soil in that district, but from which a yield of over 17bush. per acre was obtained. Twelve years ago the average yield was 9bush. per acre, and that increase had been brought about through more efficient methods of cultivation. The present practice was to sow only fallowed land to wheat, and sow a portion of the stubble to oats, from which the hay was cut. He thought the time was not far distant when wheat would be sown on nothing but fallow, and what little stubble there was would be sown to oats. It was a well-known fact that there were only, at the most, three weeks of ideal seeding weather which followed immediately after the first seasonable rains, and he contended that by taking full advantage of the good seeding weather, it would be possible to increase the yield by from 4bush. to 6bush. per acre. During the past two seasons he had observed very closely the results of sowing on his own farm, and found that wheat cropped within three weeks of the first rain averaged as follows:—1921-22, 14½bush. per acre; the average for the farm was only 8½bush. During 1922-23 the wheat sown at the same period after a good rain late in April averaged 15bush., whereas the average for the whole of the crop was only 10bush. per acre, thus proving, in his case, that late, or early dry sowing was a mistake. Fairly satisfactory, and in some cases very good results, had been obtained from wheat sown before rains, but he believed that much better results would be obtained by delaying sowing until the ground was moist enough to ensure a good and immediate germination. In preparing stubble land for seeding, he would burn off the stubble as soon as possible, cultivate it with a rigid tyne cultivator, pick off all the loose stumps, and then harrow down to ensure all weed seeds being buried so that the rubbish would not germinate after a fall of rain. He would then pickle the seed wheat. If bluestone were used, that could be done at any time previous to sowing. He had pickled seed wheat when carting it into the barn at harvest time, and had received excellent results from that practice. Many persons made the mistake of building a chaff-shed too small for requirements. He thought it should hold at least 8 tons of chaff, and the farmer should never have to stop seeding operations to cut chaff. The drill, cultivator, and all the plant required for seeding should be overhauled, and all worn parts should be replaced, so that there would be no delay in that respect when the rain came. For seeding purposes he thought the best implement was the spring-tyne cultivator, because that implement made a splendid seedbed and was a good weed killer. With good clean fallow, and stubble that had been well worked after harvest, the cultivator would kill all the weeds that germinated, and it would then only be necessary to use a light drill-harrow after

the drill. He thought that if a farmer had a 10ft. spring-tyne cultivator and a 20-disc drill with harrows attached, and 14 horses, he would have no trouble in cropping 450 acres in three weeks, and he felt confident if that method were carried out there would be a welcome increase in the yields. During the discussion which followed, Mr. Petch stated that he thought the farms were too large in that district. If the area of each holding were restricted to 800 or 900 acres, the methods of cultivation would improve greatly. At the present time on the large farms the farmers, in a number of cases, had only half, and sometimes less, of their land cleared, and cropped up to 800 or 900 acres each year with 12 or 14 horses. He was sure that if the same plant was used to crop half the area, more wheat would be grown. Messrs. Mutter, May, F. Heitmann, and Priest also discussed the paper.

YOUNGHUSBAND.

June 28th.—Present: 10 members.

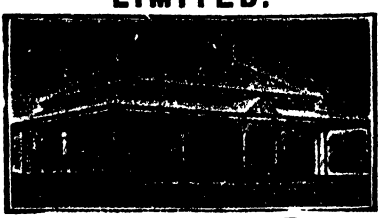
Poultry as a Side Line.—Mr. W. H. Bates, who read a paper dealing with this subject, said, whilst poultry-keeping was a very interesting and profitable side line on the farm, it was too often neglected on the average holding. The work connected with the fowls was by no means strenuous, and the gathering of the eggs and the setting of the hens could be performed by the women folk. Two of the main factors that had to be taken into consideration if a person wished to make a success with the poultry, were the judicious selection of a breed and careful management of the birds. The writer was of the opinion that there were only two breeds that were worthy of consideration, and they were the White Leghorns and Black Orpingtons. The chief points in the management of the flock were cleanliness, feeding, hatching, patience, and enthusiasm. Cleanliness.—Unless that important point was strictly adhered to the farmer would be courting disaster, because disease and vermin would very soon cause a great loss amongst the birds, and especially amongst chickens. All sheds and houses used by the birds should be well ventilated, but not draughty. Straw roofs were cooler than any other form of roof, especially in districts that had very hot summer weather. Feeding.—Fowls should be fed at regular hours, twice each day, in the morning and the evening, with headings, screenings, and other grain. The diet should be occasionally varied by giving the birds a warm mash of bran and pollard mixed with green feed. In cold weather such a diet was conducive to egg production. If rabbits could be obtained on the farm, they could be boiled and the meat fed to the fowls. The water should always be kept in the shade, the troughs kept clean, and an occasional dose of Epsom salts

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added to the water, would help to keep the fowls in a healthy condition. He was of the opinion that hatching chickens in the natural way was the better method for the average farmer. Before setting the hen, care should be exercised in selecting the eggs. Misshapen, double-yolked, and thin-shelled eggs were useless. The hen should also be examined for tick and lice, because if she harbored such insects they would prove fatal to the chickens. If the hen had scaly leg that disease would also be passed on to the young birds. Hatching should be done during the months of August and September, so that the birds would have finished moulting before the commencement of the cold weather, and would be laying when eggs were at a high price. The most prevalent diseases affecting fowls were roup, diarrhoea, and dysentery, and the speaker strongly advised the destruction of any birds ailing with such complaints. Scaly leg could be cured by an application of kerosene and lard. Lice and tick were very difficult to eradicate, but a continual spraying of the perches and houses with hot soap suds and kerosene would, in the majority of cases, get rid of the pests. All roosters should be separated from the laying hens. Mr. Bates thought that on the average farm a flock of from 200 to 300 birds could be kept without very much bother, and these, if managed carefully, should return the farmer a profit of 10s. per head each year. An interesting discussion followed, in which Messrs. J. and H. Gowling, G. Mann, and H. Brinkley took part.

COOMANDOOK, June 20th.—An interesting discussion took place on the most suitable type of combined drill and cultivator to use in mallee areas. Mr. Trestrail read an article dealing with the valuable work of seed selection that had been performed by the late Mr. W. Farrar.

SOUTH AND HILLS DISTRICT.

BLACKHEATH.

June 29th.—Present: nine members and three visitors.

CATTLE ON THE FARM.—Mr. R. S. Talbot, in a paper dealing with this subject, said the cow was one of the most useful and necessary domestic animals, supplying the household as it did with milk, cream, and cheese. On the majority of holdings devoted to agriculture the farmers did not bind themselves to any particular breed, but there was no doubt that it would be more profitable for the farmer to see that the two or three cows that he kept were good ones and not mongrels, as were so often seen on farms at the present time. Good feed was a necessity if the cow was to give maximum returns. Green feed played an important part in milk production, but as that was not obtainable on most farms, good chaff, with liberal additions of bran or crushed oats, made an excellent substitute. Calves should be dropped in April or May, because there was an excellent market for butter during those months. He considered it a mistake to milk the cow right up to the time of calving. She should be allowed a spell of about three months in order to give her a chance to build up her constitution. The milking Shorthorn was a favored breed with farmers, because animals of that breed were of a quiet disposition, good milkers, and easy to keep, and when they had finished work at the bucket, they could be fattened and sold to the butcher at a good figure. The cows should be brought in quietly from the grazing paddocks, not chased about and excited with dogs, as was too often the case.

CYGNET RIVER.

July 9th.

HAY AND CHAFF.—In a paper under this heading, Mr. H. Cook said in the growing of crops for hay one had to take into consideration the varieties of wheat or oats which were favored by working horses or animals being fattened for market. Clean land and clean seed were two most essential points in growing successful hay crops, and the quantities of seed and manure to be sown to the acre also required careful thought. Land on which it was intended to grow the hay crop should be fallowed and well cultivated, and advantage taken of the

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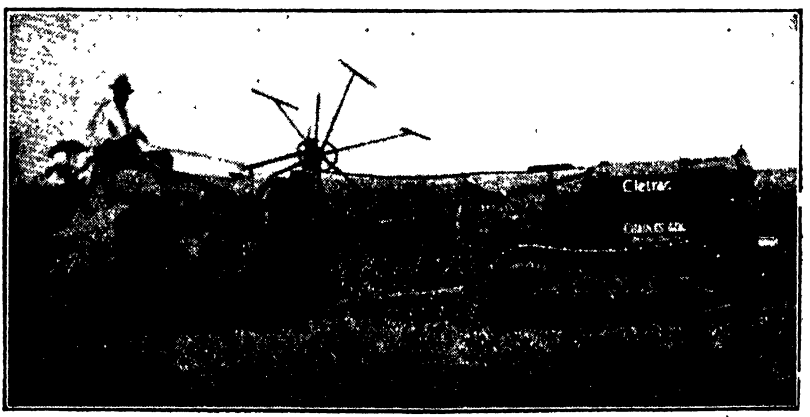
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first rains for that purpose. For that district, he did not advocate deep ploughing, except on the rich river flats, where there was no danger of bringing the clay subsoil to the surface. Mr. Cook favored a mixture of Calcutta Cape oats and Le Huguenot wheat, sown in the proportion of two of oats to one of wheat. Algerian oats were also a good crop for hay, but should be allowed to become thoroughly ripe before being cut, otherwise the hay would be bitter. Calcutta oats could be cut in the green stage. Le Huguenot was a solid strawed wheat with a tall growth. Combination as a heavy weighing wheat was unsurpassed, but it could not be recommended for feeding in sheaves to horses. There were a number of coarse wheats which produced good hay for feeding purposes, and of that class he considered Florence the best, although somewhat light when put on the weighbridge. In cutting the crop, great care should be exercised to see that the binder was tying a firm and good sized sheaf. Calcutta oats could be stooked immediately after the binder, as also could all kinds of wheat if cut at the right stage, but Algerian oats made a better product if allowed to lie in the fields for a day before being placed into stooks. Carting should be commenced at the earliest possible opportunity, and the hay stored in a shed. Where no shed was available the stack should be built as high as possible on a sloping piece of land. The stack could be made mouse proof by making a gutter 1ft. deep and from 4in. to 6in. wide right around the stack. Galvanized iron should then be placed in the gutter, which could be filled in with cement. To make a good sample of chaff, the hay should be moistened with a spray pump before being put through the cutter. Attention should also be paid to the knives to see that they were properly set and sharpened. The chaff was best stored loosely in a mouse-proof shed, bin, or shed. The following estimate of what it cost to produce one ton of hay with four horses was supplied by the speaker:—Ploughing 12s., harrowing twice 3s., drilling 3s, seed 9s, super 6s., rolling 2s., binding and twine 10s., stooking 2s., carting 5s., cutting into chaff 10s., interest on plant 10s., making a total of £3 12s. for an average crop of one ton to the acre. In referring to the feeding of horses, Mr. Cook said it was a grave mistake to give the horses too much feed at one meal. Little and often was a much better practice. Extracts dealing with the "Destruction of Birds" were read from the *Journal of Agriculture* by Mr. J. J. Osterstock.

GUMERACHA (Average annual rainfall, 33.30in.).

June 25th.—Present: nine members.

CARE OF THE HORSE.—Mr. W. V. Bond contributed a paper on this subject. The stable, he said, should be the best the means would allow. Many men recommended feeding at regular hours, but in that district, when long trips to town had to be made, that could not conveniently be carried out. He would advise carrying a nosebag, and giving the horse a feed whenever a stop was made. He had found that two short feeds with good chaff and oats were much better on a lengthy journey than one long feed. He was of the opinion that food played a more important part than the whip on a long journey. Water should be provided four or more times a day. Horses would tire more quickly for the want of a drink than they would for the want of food, especially during the hot weather. Grooming should be done every morning; all the dry sweat should be cleaned off. Care should also be taken to see that the harness fitted well and did not chafe, or that would soon cause a sore. When a horse became old and spiritless, he thought the best and most humane method of disposing of the animal would be to shoot it. At the present day mechanical ingenuity was making rapid strides in displacing animal labor, but he did not think the day would ever come when the horse could be dispensed with entirely.

MEADOWS (Average annual rainfall, 25.52in.).

June 27th.—Present: 10 members and two visitors.

FARM BOOKKEEPING.—"A correct and comprehensive system of bookkeeping is just as necessary on the farm as it is in an ordinary business house," said Mr. F. Vickery in a paper dealing with the above subject. Farmers frequently had

a good deal of difficulty in compiling their income tax returns. Such trouble was due to a lack of care, or system in keeping a correct record of sales, purchases, etc. The heels of the cheque-book and the bank pass book certainly enabled the farmer to tell what moneys had been paid away and what moneys had been received, but it was difficult to tell where the money came from. He had found the keeping of two accounts, one each for the house and the farm, an excellent system of bookkeeping. The accounts should be kept separate and a note made on the heel of the cheque, showing for whom the cheque was made out and for what purpose the money was paid away. On an up-to-date farm, where revenue was constantly being received, complete accounts should be kept for all expenditure and revenue. To do that successfully it was necessary to have two cash books in addition to the ledger. Failing that, two accounts could be kept in the ledger; petty cash, or cash banked. When cash, cheques, &c., were received, an entry should be made under one of those accounts, and the account written up whenever money was taken to the bank. By such a system the farmer would be able to tell at a glance how much had been paid in, the percentage of income from each line, and the money realised from each undertaking. The petty cash account was more difficult to handle, because no bank official had anything to do with the keeping of the figures. Cash received should be totalled at the end of the month. The same should apply to all moneys paid away. The accounts should be balanced at the end of each month and any deficiency should be paid with a cheque drawn for that purpose, whilst any surplus could be shown as cash banked or cash in hand. If some such record of keeping trace of the expenditure and revenue were adopted, the farmer would save himself endless trouble and inconvenience when the time arrived for him to make up his agricultural returns.

RAPID BAY.

July 7th.—Present: 15 members.

THE USE OF FERTILISERS.—Mr. G. Roper, who contributed a paper dealing with this subject, said the present shortage of labor and the high rates ruling for wages, made it imperative that the farmer should get the best possible returns from his land. Before applying any fertiliser, the farmer should find out which was the best kind of manure to use on his land. In their district which had a heavy rainfall, most of the land was devoid of lime, and was subject to the growth of sorrel. To improve such soil, a dressing of lime was necessary. If it could be procured, he recommended a dressing of bird guano, which, was obtained from the islands on the south coast of the State. On dry lands that had an abundance of lime, he recommended the use

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of superphosphate. Wheat depleted the soil of available nitrates and soluble phosphoric acid, and it had been demonstrated that a 24bush. crop removed 16lbs. of phosphoric acid from the soil. If another crop was grown the following year, the phosphoric acid would have to be restored, and to do that it would be necessary to apply 90lbs. of superphosphate to the acre. Land that was continually being cropped required liberal dressing of manure to assure payable returns. He recommended the top dressing of pastures, and from experiments that he had carried out, he had proved that artificial manures could be applied to pastures with profitable results. By the adoption of that practice sour country could be sweetened, poor pastures could be enriched, and the carrying capacity of the land increased. The milk flow of both cows and ewes was increased, which was essential for the dairying and fat lamb industries. The best method of treating rough grass lands was to broadcast the fertiliser, but where the land was suitable the fertilisers could be distributed with the drill.

ASHBOURNE, July 23rd.—Mr. V. H. Payne read a paper "Points for Potato Growers," in the course of which he stressed the necessity for the thorough preparation of the soil, and a personal inspection of the seed to ensure the success of the crop. An interesting discussion followed in which Messrs. C. Pitt, A. South, and H. R. Meyer took part.

BLACKWOOD, July 16th.—Several subjects of local interest, including "The Standard Fruit Case," "The Upper Sturt Water Scheme," and "Balancing Young Fruit Trees," were brought before the meeting and an interesting discussion followed.

IRON BANK, June 20th.—The meeting discussed subjects relating to the horticultural practices in that district. A programme of work for the ensuing six months was prepared, and the officers for the year 1923-24 were elected.

LENSWOOD AND FOREST RANGE, June 25th.—After the election of officers for the ensuing term and the presentation of the annual report by the Hon. Secretary (Mr. H. H. Schultz), Mr. B. J. Lawrence read a paper, "The Standard Fruit Case"; Mr. M. Vickers read a paper dealing with the report of the Blackwood Experimental Orchard; and Mr. H. Schultz contributed a paper dealing with the subject "Pruning."

SHOAL BAY, June 26th.—A member read a paper from the *Journal of Agriculture*, "Combined Drill and Cultivator *versus* Separate Implements," and an interesting discussion followed, in which the majority of members expressed a preference for the separate implements.

SOUTH-EAST DISTRICT.

KYBYBOLITE (Average annual rainfall, 22in.).

June 28th.—Present: 10 members and two visitors.

THE FARM FRUIT GARDEN.—The following paper was contributed by the Hon. Secretary (Mr. S. C. Billinghurst) and read by Mr. A. H. Bradley:—"This is a subject that is well worth the consideration of every landholder, whether large or small, because apart from the usefulness of the garden in supplying the home with fresh fruit, it beautifies the homestead and tends to add value to the property. In many instances, where farmers have no fruit garden, a weekly supply has to be bought from the local fruiterer, whose fruit is oftentimes days old and in some cases weeks, before it finds its way to the consumer. This alone would be the cause of much less fruit being eaten in the home than otherwise would be the case, and I am sure that if a farmer looked after a small garden his time would be well spent and the return profitable, and as well he would gain the gratitude of his wife and family. Select the piece of land on the property for the garden, preferably one with an eastern slope, consisting of soil of a loamy

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22, King William Street, Adelaide.

FRANK BLAMEY, F.F.I.A., Manager.

texture. A sandy loam has its advantages over heavier soils, because fruit trees invariably do much better on sandy soils, and they are also lighter to cultivate. Consideration should also be given to the natural drainage. In preparing the soil for the trees plough the land as deeply as possible and subsoil. Where no subsoiler is available use dynamite, or some other similar explosive. After ploughing, cultivate the block to bring the soil to a fine tilth. Choose a system of planting and stake out the positions for the trees. Knowing where the tree is to be planted is of great importance where a subsoiler has not been used and where it is intended to use explosives. This latter is done by simply driving an ordinary crowbar, 1in. in diameter, down 3ft. or 4ft. into the ground. Remove the bar and insert one or two plugs of explosive attached to a fuse and fire in the ordinary way. This method, I believe gives quite as good results as subsoiling, and is much quicker. When the trees are ready to be planted remove the surface soil, placing it on one side of the hole, and then take out the subsoil, keeping it separate from the soil. It is then a good plan to dig well into the bottom of the hole from 1lb. to 2lbs. of super and cover it over so that the roots will not come into contact with the fertiliser. Cut away all broken or bruised roots and use the surface soil, into which has been mixed about 1lb. of bone dust, to fill up the bottom of the hole, and press the soil tightly around the roots of the tree and fill up the hole with the subsoil. Select the trees in such a manner that a continuous supply of fruit will be obtained throughout the season, at the same time taking into consideration the qualities of the different varieties for jam making, preserving, and drying. Though for the first few years the demand will be greater than the supply, there is bound to be a time when the tables will be reversed, and then only can the full value be obtained with varieties possessing one or more of the above qualities. The garden in the main should consist of apricots, peaches, plums, figs, apples, pears, quinces, oranges, lemons, and vines. There is no question that some varieties of Japanese plums and nectarines are very fine and luscious fruits, and are worthy of a place in small quantities, but neither can be recommended for jam making or preserving. Loquats and cherries are, generally speaking, not worthy of much consideration, because only in selected areas can they be made to bear profitably. There would be little or no need to duplicate varieties of the above-named fruits when planted 20ft. apart, because approximately 100 trees per acre can be planted on the square system, and approximately 125 trees per acre on the septuple system. Care of the orchard:—Cultivate the soil thoroughly during the year. It will be found to have a marked effect on the trees and fruit if the soil is harrowed or cultivated after rain has fallen during the summer months. Prune the trees, especially in the early years of growth. Should any signs of diseases appear, commercially prepared remedies are obtainable which are easily handled and are not very expensive. Small quantities of manure supplied from time to time will produce more and finer fruit. I would like to make a few remarks on gardens already established on properties. In a great number of cases, trees of poor varieties have been bought from unreliable sources. The trees have no vigour and the fruit is inferior. These should be taken out and replaced by new ones. Again, some trees have passed their stage of profitableness and are very much on the decline. Some of these can be renovated by cutting hard back and made to produce young vigorous wood, and later on fruits, but in the majority of cases it is much better to replace by new trees. If the garden is naturally unsheltered from prevailing winds much benefit will be gained by supplying a breakwind in the form of a row of almonds or pines, both being valuable assets to the property. Finally, if reasonable care is taken of the garden, the time spent will not have been unprofitably used."

MOORAK.

June 21st.

SPRAYING FRUIT TREES.—Mr. H. H. Orchard (Orchard Instructor and Inspector for the South-East) read the following paper:—"Spraying, as a branch of fruit-growing, is, unfortunately, not recognised as it should be. The commercial orchardist knows—or he should know—the important part spraying

AGRICULTURAL PUBLICATIONS.

The following publications have been issued and are available for distribution at prices mentioned :—

"First Aid to the Horse," by F E. Place, B.V.Sc., M R C V.S., &c; price, 3s.; posted, 3s. 2d.
"Fruit Tree and Grape Vine Pruning," by Geo. Quinn: price, 3s 6d ; posted, 4s 3d
"Poultry Manual," by D F. Laurie; price, 1s. 3d.; posted, 1s 5d.
"Vinegrower's Manual," by A Sutherland (1892); price, 6d., posted, 7d.

Journal of the Department of Agriculture, 1s. per annum in advance; 3d. per single copy to residents in South Australia. Other places, 2s 6d. per annum; single copies, 6d. each

The following bulletins and leaflets may be obtained by residents of South Australia by sending a 1½d. stamp for postage of each copy required; other places, 3d each :—

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THE AGRICULTURAL BUREAU.—Particulars of this Organization, of which every farmer should be a member, can be had on application to the Department.

are kerosene emulsion, red oil emulsion, resin wash, and poison gas, for which latter purpose air-tight compartments are required. In conclusion, a few of the common pests of fruit trees found in this district will be briefly described, together with the treatment recommended. Codlin Moth.—The damage this insect does to apples and pears is well known. It is a chewing insect, and is readily treated by timely applications of arsenate of lead. The first spraying should be done as soon as the petals fall from the flowers, care being taken to see that the calyx end of the forming fruit is well filled with spray. A second application a fortnight later is necessary, followed by a third from three to four weeks later. Further applications may be necessary if further broods hatch out. An important adjunct to the treatment of this pest is having the trees clean; all dead and broken bark should be scraped off and broken ends or cracked limbs removed. No stakes nor rubbish should be left near the tree, and diseased fruit should not be left on the ground when it falls. These points must be followed if the arsenate is to be thoroughly effective. The use of bagging bandages placed around the stem and fastened with a nail will materially help, but they must be examined regularly once a week and all grubs found underneath destroyed. The arsenate of lead in the powder form should be used at the rate of 1½lbs. to 50galls. of water. Curculio Beetle.—This insect works only at night time, remaining hidden during the day time. It eats the edges of the leaves, the bark off the young shoots, and particularly that portion just below the bud. The remedy is to spray the tree with arsenate of lead at the rate of 1lb. to 8galls. to 10galls. of water. Strips of sheepskin placed around the stems with the wool outwards will stop their upward progress, but does not exterminate them. Peach Aphis.—Spray when you see them with kerosene emulsion, red oil emulsion, or tobacco wash, and repeat the dose in a few days, and a third a few days later still, for remember it is only those touched by the spray that are killed. Mussel scale is very prevalent in the district on old apple and pear trees. The treatment at this time of the year is to prune the tree, burn the prunings, and then spray the tree thoroughly with red oil emulsion. Woolly Aphis.—Kerosene emulsion or red oil. The spray for this pest must be driven with force right on to the aphis by holding the nozzle close to the affected parts. The spray must go through the woolly covering and on to the aphis to be effective. Where only a few trees have to be treated, the use of pure kerosene dabbed on to the parts with a stiff bristled brush is recommended. Shothole and scab of the apricot is known on local-grown fruit, and yet it is very easily treated and kept under. Bordeaux mixture is the remedy, spraying on in the autumn and again when the flower buds are beginning to open. Failing Bordeaux, Burgundy will do. Curf Leaf of Peach and Nectarine.—This belongs to the same class as 'shothole,' and, like it, it is easily kept in check. An application of Bordeaux when the buds are quite dormant, followed by another when color begins to show in the buds in the early spring, will generally free the tree of 'curf leaf.' A good plan is to destroy all dead leaves. There are other diseases, but the above-mentioned are probably the most commonly found in the district, and time prevents a more detailed list. Reference to the subject matter of the paper will help in the treatment of any pests met with and not enumerated.''

NARACOORTE, June 9th.—The Hon. Secretary (Mr. G. J. Turnbull) read a paper, ''Some Economic Factors Relating to the Use of Horses and Tractor on the Farm,'' that had been contributed by the Government Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S., &c.) and an interesting discussion followed.

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

No. 2. SEPTEMBER 15, 1923. VOL. XXVII.

Published Monthly by the Department of Agriculture.

Edited by H. J. FINNIS.

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"The Editor, Journal of Agriculture, Victoria Square, Adelaide."

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G. F. JENKINS,
Minister of Agriculture.

POINTS FOR PRODUCERS.

Central Eyre Peninsula Conference of Agricultural Bureau.

The Annual Conference of Central Eyre Peninsula Branches of the Agricultural Bureau has been arranged to take place at the Government Experimental Farm, Minnipa, on September 27th and 28th. In addition to the papers, which will be read by representatives of different Branches, and addresses by Officers of the Department, an opportunity will be taken of inspecting the work being carried out on the farm. The Department of Agriculture will be represented at this gathering by the Director (Professor Arthur J. Perkins), the Superintendent of Experimental Work (Mr. W. J. Spafford), the Vice-Chairman (Capt. S. A. White, C.M.B.O.U.), the Secretary of the Advisory Board of Agriculture (Mr. H. J. Finnis), and others. Capt. White will deliver a lecture, illustrated with lantern views, "Across Australia by Motor."

Conference of Hills Branches.

The Annual Conference of Hills Branches of the Agricultural Bureau is being arranged to take place at Balhannah on Thursday, October 11th.

Green Patches in Cereal Crops.

"The top dressing in the early spring, with a nitrogenous fertiliser, of patches of cereal crops which have gone yellow during the winter gives wonderful results in most cases, and in your conditions you will be wise to give it a trial," advises the Superintendent of Experimental Work (Mr. W. J. Spafford) in replying to an inquiry. "Both nitrate of soda and sulphate of ammonia are suitable forms in which to apply the nitrogen, a slight advantage resting with the nitrate of soda as a spring application. One pound of fertiliser to every 43 sq. yds. of crop will equal a dressing of 1cwt. per acre, but for your purpose of only invigorating patches in the crop it would pay to increase the amount used to between 1lb. for every 30 sq. yds. and 1lb. for every 20 sq. yds.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

"H. C. P.," Honiton, has cow with injury to the teats and the presence of lumps in the udder.

Reply—I should advise you to obtain a teat catheter. After sterilisation insert this carefully into the affected teat and irrigate out with a solution of boracic acid, one teaspoonful to a pint of water that has been previously boiled and allowed to cool. Irrigate twice daily. With regard to the lumps, these are due to a thickening on the lining of the teat and probably extending up into the milk basin. They are, as a rule, difficult to treat, and are very persistent. With regard to fistula, the teat itself, complete healing can only be hoped for when the animal is dried off. There should be no danger of blood poisoning as you suggest if careful antiseptic precautions are taken by thoroughly cleansing your hands and sterilisation of the catheter before inserting. In addition, the udder may be massaged with salad oil for the purpose of assisting the reduction of the lumps in the udder.

"E. J. B.," Wudinna, has foal passing watery fluid from navel.

Reply—This condition is known as pervious urachus, a condition occasionally remaining after birth. Normally this closes naturally. The fluid escaping is the urine coming from the bladder. By way of treatment I should advise you to obtain a strong wax thread, and with a needle pass it through the tissues at the back of the opening and bringing it forward and tying in a knot. If a portion of the tube is visible, endeavor to encircle this with the thread. This method should be effective in causing a permanent closure. The urine then will take its natural course and be passed in the ordinary way. Apply an antiseptic, such as carbolic acid water or tar water, on the outside to prevent the flies adhering.

"L. C. K.," Milang, reports cow stiff in hindquarters and unable to lift tail.

Reply—From your letter I gather that the condition described is due to an injury probably caused by the bull. In all probability it may be a fracture of one of the pelvic bones, which has probably implicated the spinal cord. This is shown by the condition of paralysis shown in the tail. I should advise you, in the way of treatment, not to interfere with the animal. Make her comfortable and see that she has plenty of laxative food. If she should go down support her with slings. Medicine in a case of this sort is not indicated.

"L. P.," Redhill, has mare with tender feet and decaying frogs.

Reply—It would appear from your letter that the animal's feet have become bruised whilst working without shoes. The sensitive frog probably has become involved with possibly the formation of pus, which would explain the condition of the frog such as you describe. I would advise you to move the shoes, poultice the feet with bran and linseed meal, to which a little fine powdered charcoal has been added. Afterwards carefully trim any ragged portions of the frog, at the same time examining for the presence of any pus which may have accumulated in the sole of the foot. If this is present the sole will be required to be bared with a knife to allow the escape of any accumulation. Afterwards

clean the foot and dress the frog with dry calomel, or a solution of zinc sulphate 4ozs., lead acetate 4ozs, once daily. When the shoes are replaced it will be advisable to supply a leather pad between the sole and the shoe.

Hon. Secretary, Agricultural Bureau, Nantawarra, reports heifer just in milk with a hole in the back of the teat.

Reply—This is a milk fistula and is due to an injury of some kind, such as may be inflicted by barbed wire. It is very difficult to treat these milk fistulae during the lactation period. When she goes dry again you can stimulate healing by the application of a caustic pencil (silver nitrate).

"M. M. P.," Pyap West, asks what quantity of alkaline solution should be injected into the womb prior to service; (2) can you recommend any other lotion for the same purpose; (3) what is a good book dealing with the artificial stinting of mares.

Reply—(1) About ½gall. of lukewarm water in which 4ozs. of bicarbonate of soda has been dissolved. (2) Weak solutions of disinfectants are sometimes used, such as a one in 5,000 perchloride of mercury solution. This material can be obtained in tabloid form, one being used to five pints of water. The latter solution should be used a day or two before the mare is expected to come in season. (3) Write to Messrs. A. M. Bickford & Sons, Currie Street, for their veterinary price list, which also contains instructions for use of the impregnator. The cost of the instrument is about 30s.

Hon. Secretary, Yadnarie Agricultural Bureau, asks (1) cure for warts on cows' teats, and (2) whether horses can be affected with blindness through eating "paddy" melons.

Reply—(1) Warts on cow's teat. Treatment depends upon the extent of the trouble. Some cases will respond to the application of castor oil after each milking. Large pedunculated warts can be removed by clipping off with a sharp pair of scissors. If there are many do only one or two at a time. The application of caustic is recommended, and for this purpose you may apply silver nitrate, which can be obtained in the form of a pencil or glacial acetic, and which may be applied carefully with a wooden match. Two or three applications will be necessary at intervals of some few days. In applying the silver nitrate wet slightly the surface of the wart and then apply the caustic. (2) Horses eating paddy melons. The blindness is due to horses eating the melons. I do not think it probable that blindness is ever caused by the juice reaching the eyes in the manner you suggest, though I believe that the frequent local application of the juice of the melon would cause the same trouble.

"V. B.," Beachport, has cow with a lump the size of a pea in the corner of the eye.

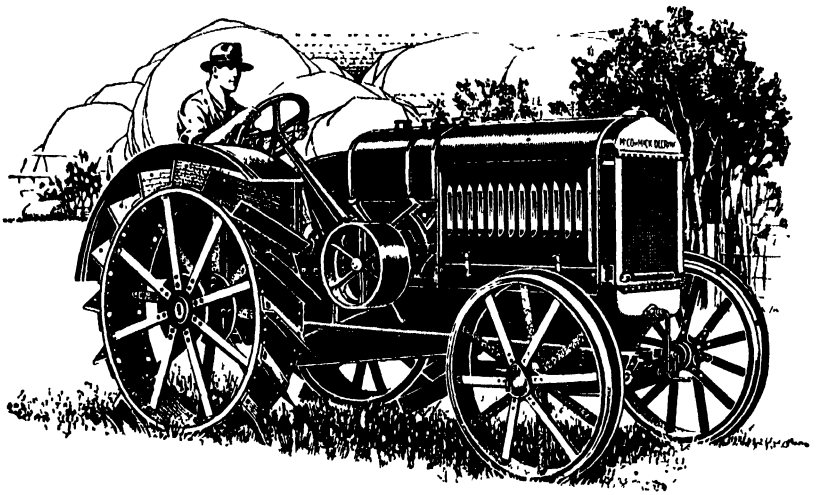
Reply—This is a new growth and it requires surgical removal. This should be done while the condition is easily dealt with, as at present. You will require a pair of forceps and a pair of sharp curved scissors. Secure the cow firmly. Seize the "haw" or third eyelid with the forceps and draw it outwards, remove the growth with the scissors, cutting away portion of the healthy tissue. Apply a little boracic lotion as a dressing. Make this by dissolving a dessertspoonful of boracic to a pint of water. Do not use caustic applications for the removal of this growth.

"J. O'C.," Monash, reports cow with stiffness of hindquarters and is only able to move about with great difficulty.

Reply—I advise you to give her one level teaspoonful of powdered nux vomica daily. Mix this with a little treacle and give on the tongue. I recommend you to supply your cows with salt and bonemeal, 1oz. of each twice daily. They should receive a well balanced ration, and the salt and bonemeal is best given in the feed.

Hon. Secretary, Agricultural Bureau, Shoal Bay, submits the following inquiries on behalf of Branch members—(1) Mr. O. B. Schaefer has aged bay mare with a swelling between forelegs.

Reply—Put her on soft laxative food and give her 1oz. epsom salts and one teaspoonful saltpetre twice daily for a week in her drinking water or mash. Bathe the swellings daily with warm disinfectant solution, such as carbolic, kerol, or izal, 1oz. to a gallon.



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(2) Mr. H. T. Noske asks reason for appearance of black lambs in a flock of sheep.

Reply—A pure Merino flock may occasionally produce a black lamb, and it is usually considered to be due to reversion to some far back ancestor.

Mr. W. O. Kruger, Hon. Secretary, Yadnarie Agricultural Bureau, has horse seven years old with large, soft lump on the shoulder.

Reply—Put him out of work and apply hot foments. If the swelling does not subside, apply a little red blister and watch for abscess formation, which will require evacuating and draining with a clean, sharp knife as soon as pus formation takes place.

"W. G. T.," Monash, reports *re* draught gelding which trembles from fetlock to stifle with exercise.

Reply—In the absence of any further information, the trembling can only be regarded as due to muscular weakness. Put him out of work for a few days and then give only light work. If there is any further development or lameness write again.

[Replies by F. MURRAY JONES, B.V.Sc., M.R.C.V.S., Assistant Government Veterinary Surgeon.]

Hon. Secretary, Miltalie Agricultural Bureau, asks which is the best method of poisoning foxes—arsenic or strychnine.

Reply—The best drug to use is strychnine. It is quicker in action. Arsenic is not usually used for this purpose. The animals have a good chance to get some distance before it becomes effective. The best way to use strychnine for the purpose of bait is to get a sheep or lamb carcass. Carefully score with a long knife channels in the flesh, sprinkling the powdered strychnine between the cut surfaces, then close them down. Do not handle the carcass any more than you can help with your hands.

"H. C. C.," Mallala, reports horses "tucked up," lie down and roll with feet in the air.

Reply—The symptoms described by you could be the result of several causes, such as indigestible food which has become impacted from foreign body such as sand, or even from flatulent colic caused by fermentative changes accompanied by formation of gases. It may be even produced, as you suggest, from damaged chaff, but not necessarily that condition known as forage poisoning. The best and safest treatment would be one pint of raw linseed oil and turpentine, 1oz., given as a drench. Follow up with a level teaspoonful of powdered nux vomica given in treacle once daily by smearing on tongue and teeth.

"L. G. R." Sandilands, has bull with a swollen sheath.

Reply—The condition may be due to a variety of causes, such as an accumulation of fatty material inside the sheath, grass seed, or accidental injury. I would advise you to thoroughly wash the swelling with soap and warm water, and then examine the entrance and inject a small quantity of salad oil into the sheath. To the swelling apply hot foments as often as possible. If the passage of urine is difficult, the animal will have to be cast, and the opening enlarged with a sharp knife. Injections of warm solution of Condy's fluid (claret color) into the sheath is also advisable.

"Dairyman," Georgetown, has cow which a few weeks ago had a bad "choke," and belched up a large quantity of chaff and blood.

Reply—Supply her with soft, easily digested food. Give her the following medicine:—Carbonate of ammonia, 1½ozs.; powdered nux vomica, ¾oz. Mix. Divide into 12 doses. Give one dose daily with a pint of cold water and a cupful of treacle. The number of doses of purgative medicine she received was excessive, and would weaken her considerably.

J. R.," Cooke's Plains, has horse that when castrated at two years old only one testicle was removed. The horse is now four years old, and the cord attached to the remaining testicle is as thick as a man's finger. The inquirer asks whether the removal of the testicle will result in excessive bleeding and risk of death.

Reply—There is always more risk in castrating an adult horse, and in this case the testicle is abnormally developed owing to the removal of one when he was two years old. I do not think, however, that the risk is a serious one, and would

suggest that he be castrated in the usual manner with the emasculator as soon as convenient. Prepare him by giving him plenty of green feed and little or no hard feed for a week or so. The principal danger is the subsequent bleeding. Put him in a clean, small grass paddock after the operation, and do not disturb him. If the bleeding appears excessive, stand him in a loose box, and put a bag which has been soaked in cold water over his loins. If it does not cease in a few hours, pack the cavity of the purse with a plug of clean dry cotton wool, and keep it in place by placing one stitch across the castration wound. Remove the following day, and cleanse the wound of all blood clots, &c.

"E. W. B.," Wilkawatt, has heifer, date of calving overdue by 10 days, and the animal strains and labors as if anxious to give birth to the calf.

Reply—The symptoms you describe point to a difficulty in calving, which may be due to many conditions, but the most likely is that the calf is not in the normal position for delivery. The only way to ascertain definitely is by an examination of the womb, which is done by inserting your hand and arm, which must be well oiled before doing so. Owing to the time which has elapsed since the symptoms were first noticed, the calf will probably be dead, and be putrifying, and you will have to assist the heifer in her efforts by, if possible, manipulating the calf so that it is in a normal position for delivery, or take it away in pieces.

SUDAN GRASS.

To a correspondent in the Farrell's Flat district, who sought information respecting Sudan grass, the following was forwarded by the Superintendent of Experimental Work (Mr. W. J. Spafford):—

Time to Sow Sudan Grass.—Sudan grass seed will not germinate while the land is cold, so it would hardly be safe to sow the seed in your district before the middle of September, and in those few years in which the land remains wet and cold until this time, the seeding should be delayed still later.

Rate of Seed.—If it is to be grown in rows wide enough apart to allow of cultivation between the rows, 6lbs. to 8lbs. of seed per acre will be necessary, but if seeded through every hoe of the drill, 9lbs. to 12lbs. per acre will be required.

Amount of Super to Use.—The crop will easily use all the plant food supplied with 1cwt. superphosphate per acre, so not less than that amount should be used.

When to Cut for Hay.—Sudan grass will make a very fair hay if cut when the most of the flower heads have appeared, and at this stage the maximum quantity per acre will be received. If left longer, the hay will be rather hard and less digestible.

Best Time and Method of Grazing the Crop.—In your conditions the crop could be grazed any time that there is any growth worth eating off, if the ordinary precautions of grazing succulent feed stuff are followed, such as being careful when changing stock from one type of feed to another, putting stock on when hungry, grazing when wet, etc. Best grazing results will be got from this fodder, as with all other forage crops, if it is fed off rapidly, then spelled until good growth is again available.

DEPARTMENTAL DOINGS.

Agriculture.

The quarterly meeting of the Mount Gambier Herd Testing Association was attended by the Director of Agriculture (Professor Arthur J. Perkins). The Director also attended the Pan-Pacific Conference as a delegate to the Agricultural Section, and delivered the opening address at the Conference of Pinnaroo Line Branches of the Agricultural Bureau.

Horticulture.

During the past month the Horticultural Instructor (Mr. Geo. Quinn) attended a meeting of the Australian Fruit Council, held in Melbourne on August 7th. Mr. Quinn also attended the Conference of Pinnaroo Line Branches of the Agricultural Bureau.

The Horticultural Inspector and Instructor for the Northern District (Mr. J. B. Harris) during August addressed a meeting of the Agricultural Bureau at Light's Pass, and visited a number of fruit growers in the Melrose and Bagot's Well districts. Recently Mr. Harris has also given pruning demonstrations and lectures to Branches of the Bureau at Williamstown, Clare, and Virginia.

Poultry.

The Poultry Expert (Mr. D. F. Laurie) attended the Conference of Southern Branches of the Agricultural Bureau. During the past month numerous suburban breeders have been visited, and on August 31st Mr. Laurie weighed the eggs in the recently concluded Seaton Park Egglaying Competition.

Dairying, Etc.

The Assistant Dairy Expert (Mr. H. J. Apps) visited and advised dairymen and factories in the following centres:—Woodside, Mount Gambier, Peterborough, Quorn, and Yongala. Mr. Apps delivered addresses at Woodside, Mannanarie, and Glencoe. The dairy herds in the Mount Gambier association were also inspected by this officer.

During August the Secretary Advisory Board (Mr. H. J. Finnis) attended Conferences of the Agricultural Bureau at Strathalbyn and Lameroo, and a field trial at Yarcowie. He also delivered an address at the inaugural meeting of the Light's Pass Branch of the Bureau.

Mr. F. C. Richards attended and addresed the annual meeting of the Two Wells Agricultural Bureau, and delivered an address at the Branch recently formed at Mannanarie.

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ADDRESS BEFORE AGRICULTURAL SECTION OF PAN-PACIFIC SCIENCE CONGRESS, 1923.

[By ARTHUR J. PERKINS, Director of Agriculture, South Australia.]

I have been asked by those responsible for this section to initiate a discussion on the associated questions of Agricultural Research and Agricultural Education And whilst I have felt honored by the request, I must confess to embarrassment as well. The thought that representatives from older countries might be disposed to cavil at our claim to speak on these subjects, was unavoidable; on reflection, however, rightly or wrongly, I have satisfied myself that we can make good this claim, however much our methods and work may have differed from what obtains elsewhere.

I am aware that there are some who would refuse recognition as "Research" to work, the objective of which is nakedly "utilitarian." If, in this connection "utility" is to be banned and the search after truth to be hedged within austere and narrow lines, somewhat on the principle of "art for art's sake," then I shall be forced to admit that our claims to recognition are probably slender enough. But is it not legitimate to ask whether Research, like other less exalted forms of human activity, must not perforce adapt itself to its environment, or else starve for lack of sustenance? Here in Australia, we have found ourselves, a mere handful of men and women, confronted by conditions for the most part unknown, without a body of inherited tradition to guide us, and the wilderness to conquer Economically, we were bound from the outset to attempts to wring a livelihood from the land, notwithstanding our ignorance of the conditions that surrounded us; and equally inevitably, as it seems to me, when the need of them came to be felt, Agricultural Research and Agricultural Education would be driven along "utilitarian" lines. We have had, therefore, to deal with the difficulties and hard facts of the day, leaving refinement and philosophy for the morrow. Broadly speaking, then, with us Agricultural Research has sought to take the place of that somewhat rigid traditional lore, which guides the old-world farmer and at times deadens his powers of initiative. Similarly, Agricultural Education has hitherto sought to impart to our youth a strictly practical training, and a mastery over the details of work rather than a profound understanding of the eternal principles that may be supposed to underlie them.

I offer no apology for so materialistic an outlook, beyond the statement that it is the tribute we have had to pay to such progress as we may have achieved. Moreover, our minds are still in the receptive stage and a change in attitude will not be difficult to us should future circumstances appear to warrant it.

Some of the difficulties we have had to face in the past I shall touch upon lightly. In the first place, no degree of Research was practicable until circumstances had rendered the local atmosphere favorable to its prosecution. Early settlers struggling against pioneering conditions would be blissfully unconscious of any need of it: and only when the repeated failures of those who had brought over with them ancestral traditions of other lands, had become glaringly apparent, did the need for "utilitarian" Research begin to make itself felt. We believe that during the life-time of the present generation much has been done towards meeting the requirements of the farming community, and that our rapidly rising agricultural production is some evidence in our favor.

Again, "utilitarian" Research and "pure" Research do not appeal to the same public. Of the two, our public is infinitely more exacting, as it is more extended than that of those whose goal is infinity. The work itself and the methods involved are usually a matter of indifference to our public; results which can be speedily converted into economic good is its only concern; and unfortunately its impatience is frequently such as to sterilise efforts, which might otherwise have proved fruitful. The seriousness of this difficulty can be appreciated only by those who have had to contend with it: it is in my view responsible for much that has hitherto been left undone, and what is worse, for much that has been badly done.

I have referred to our rapidly expanding agricultural production as some evidence of the success of local "utilitarian" Research. I propose illustrating the position by a few figures before passing on to details. In the first place let it be noted that our history as an agricultural community does not extend further back than four generations for a small section of the Continent and not more than two and three for the vast balance. Our rawness cannot, therefore, be gainsaid, and in the circumstances an Agricultural and Pastoral Revenue (1921) of about £260,000,000 is something very much to the credit of little over five and a half million people. It represents over £47 per head of population. Only 15 years earlier (1906) this revenue was little more than £80,000,000, or £29 9s. 6d. per head of population.

If it be asked in what manner Research and Education have contributed to the rapidity of our material progress, I shall say that

three generations ago the agricultural possibilities of the country were unknown quantities; that after early skimming of obvious natural fertility the first two generations fought unaided a gradually losing battle against Nature; and that it was left to the third generation, assisted by Research and Education, to turn the tide of battle and lift Agriculture to its present condition of prosperity and affluence. The special part played by these two factors is perhaps difficult to particularise apart from details. Nevertheless, attention may be drawn in this connection to the systematic accumulation of of meteorological data throughout the Commonwealth: it constitutes Research work of first importance and has rendered possible the early classification of districts and their agricultural possibilities. As early as 1865 the late Mr. G. W. Goyder, Surveyor-General in the State of South Australia, was able to trace over the map of South Australia a rainfall line, north of which farmers would attempt to grow wheat at their peril. And even to-day we are able to admire the accuracy with which Goyder's line was drawn. Without meteorological research progress would have been slow indeed and the road to agricultural settlement strewn with economic wrecks.

It would be quite impossible in the course of a short address even to summarise all that has been done in this new country towards laying the foundations of rational agricultural practice over a great variety of soils and climates; nor do I propose making the attempt. I shall, however, endeavour to illustrate the general position by a rapid reference to "Wheat," our main crop, and one with which I am perhaps most familiar.

We have, I believe, made remarkable progress with wheat, and notwithstanding our relatively low mean yields, I question whether to-day there is any other country of similar area making better use of its economic, climatic, and soil conditions for the same purpose.

In 1860 we had about 644,000 acres under wheat, yielding 10½ million bushels: 60 years later, in 1920, we had over 9,000,000 acres, yielding approximately 146 million bushels. I am aware that these figures are dwarfed by the production of countries such as the United States and Russia: on a population basis, however, we can challenge comparison with any country.

Within the space of three generations our people have learnt how to grow wheat in a country, the general conditions of which were at the outset totally unknown. By this I wish to assert that to-day our best farmers are extracting from the land the highest yields that local conditions permit of; and this, I submit, is no mean feat for so brief a period of time. That there is still ample room for improvement in

the mean yields of districts and States, may be freely admitted; and towards this end, Education, in its broadest meaning, may be said already to have set its hand to the plough.

Let us analyse what the growing of maximum wheat crops really implies, and note how much personal Research and Educational effort must necessarily have preceded it.

There was first to determine the extent to which this hardy crop would adapt itself to local vagaries of climate. To the extent that latitude is an index to climate we had reason for hope in so far as the southern portion of the Continent was concerned; and hope has been justified, by experience, at all events, south of the 32nd parallel, which, relatively to the Northern Hemisphere, suggested climatic conditions similar to those obtaining over Southern Europe and Northern Africa.

We discovered in the course of time that over what has come to be known as the Wheat Belt rain was confined to the winter and spring months of the year, a period varying with seasons from five to eight months. Such crops as were sown had to grow under these limitations, and a general system of cultivation adapted to them had to be developed.

Unfortunately, profound economic differences debarred us from taking advantage of the practices of countries climatically similar to our own; and where there was economic approximation, climates usually differed. We were driven back, therefore, on our own efforts and Research. The relatively short growing period made it imperative that seeding should coincide with the first autumnal rains, and in certain seasons should even anticipate them. Moreover, painful experience brought home to pioneers the fastidiousness of wheat, in the matter of seed-bed and the impossibility of adequately preparing it, except in the presence of a sufficiency of moisture. These facts led eventually first to the breaking up of land intended for wheat in the winter preceding seeding operations, and gradually, in the course of time, as a matter of experience and Research, to the eight or nine months of clean, well-worked bare fallow, which to-day precedes wheat over the great bulk of our wheat-growing country. It is easy to object that this is a practice that has been in use elsewhere centuries ago; it is nevertheless true that in isolated virgin country it had to be recreated afresh, and that its general adoption in a brief space of time over a vast area of country has necessarily involved much personal Research and Educational work. To-day the practice is all but universal in Australia, and will probably continue to be

so over the bulk of the country. It seems probable that the practice of preceding wheat by fallow or other suitable crops will always be restricted to limited areas of country only.

Next, consideration had to be given to the type of wheat that could be grown to best advantage under our special conditions. It should be stated here that I am making no attempt to set out these points in strict historic sequence, and that doubtless the question of suitable varieties puzzled our pioneer farmers long before the system of tillage had become more or less standardised. At the outset we depended naturally upon importations from abroad, and from time to time practically every available type has received more or less extended local trial, from the slow-growing, carpet-like winter wheats of colder countries to the fast-growing spring types of wheat from countries with relatively short growing periods. To-day, on the other hand, over the nine to ten million acres which we sow annually to wheat, it would be hard to find any important area under wheat of foreign origin. The vast majority of our wheats have been raised locally, and I doubt whether anywhere else in the world is to be found a finer collection of varieties, maintained systematically at a high standard of production by rigid and continuous selection. Indeed, the tide of importation has now turned and there is already evidence that Australian varieties are making their way into other countries similarly situated. In creating these varieties we have aimed at disease-resistance, high yields, quality of flour, harvesting convenience, resistance to rough weather, &c.; and all this implies research work of no mean order, whilst the general acceptance of new varieties by the farming community is a tribute to the educational effort which must have preceded acceptance. I have felt the invidiousness of mentioning names in an address such as this, and had hoped to be able to avoid it. Nevertheless, I cannot in this connection resist the temptation to do honor to the late William Farrer, the father of all our wheat breeders, who set himself the task of developing rust-proof wheats and ultimately left to us some of the best all-round varieties we possess to-day. His name will not be soon forgotten in Australia.

Another difficulty that we have solved in original manner was how to feed our working teams, without whose assistance wheat could not have been raised. Contrary to the practice of other countries we made the wheat field keep itself. In other words we were free from the natural inherited prejudices of older countries, in which it would have been deemed a sin to feed wheat to any but human beings, and we made hay of it. This may seem simple enough; nevertheless it was

an innovation and only research could indicate how this hay should be made and handled and fed to best advantage. This we have done and our experience is available for the use of others.

Like others, we have had to face parasitic disease and its consequences, and have succeeded in circumventing, if not in overcoming it. Red rust, once virulent, is to-day more or less unimportant. "Take-all," the consequences of virulent development of the wheat-stem killer, in new roughly tilled country, has proved serious at times, but can be controlled. And similarly with other minor diseases that have affected our crops from time to time.

Again, not only theoretically, but practically also, the local application of manures and fertilisers has received satisfactory solution. I need not perhaps recall—it is perhaps well known to all of you—that hitherto in Australia phosphatic manures alone appear to have given uniformly satisfactory results with wheat, and of these the water soluble superphosphate is in all but universal use. We are more particularly concerned with facts which bear witness to Research rather than with Research itself. I shall not, therefore, attempt to explain why this should be so; it is sufficient to note that to-day the farmer who sows wheat without superphosphate is the exception rather than the rule. It is estimated that our wheat fields absorb about 375,000 tons per annum. We lay no claim to the discovery of superphosphate; we were, however, quick to recognise its value, and moreover were among the first to demonstrate on a large scale the stimulating effects of what elsewhere would be considered very light dressings of this manure.

I am of the opinion, too, that we have proved very definitely that under our conditions of climate, wheat can be grown very advantageously on soils far lighter in texture than is commonly recognised in other countries. We have an abundance of soils of this type—mallee lands we call them—which elsewhere would be relegated to barley, or even rye, but on which we have been able to grow wheat quite satisfactorily. Indeed, in years of light rainfall it is generally from these light soils that we look for our most successful crops.

But what could we have possibly done, what would all our efforts and research have availed, had not those with mechanical talent taken up the tale and assisted towards the solution of the ever present problem of labor shortage? It is no exaggeration to state that without the assistance of our manufacturers of agricultural machinery, and of local mechanical genius, there would have been no agricultural development in this country; we should still have continued a purely pastoral sparsely populated country with enough acres under wheat to satisfy

local demands, but nothing more. The implements which are peculiarly our own, the fruit of local research and study, which have rendered possible the growing of wheat, are the stump-jump plough, the Ridley stripper, the complete harvester, the seed broadcaster, large cultivators, &c. Some of these, no doubt, are out-of-date to-day; all, however, have in their time contributed adequately towards the foundations of successful agricultural settlement.

Lastly, Research and practical experience have taught the farmer how best to join wheat-growing and sheep in profitable association: how to take advantage of natural pasture always available when wheat is not actually in the ground: how on occasion to raise forage catch-crops to make good possible grazing deficiency: and how, in the end, to build up a more complex system of farming with wheat as the main but not necessarily the exclusive crop grown.

In briefest of outline I have endeavoured to sketch out the main problems which have confronted the wheat-grower in the past, and for lack of time and space, I must leave it to the imagination as to how they have been successfully solved. There are few who would care to deny that behind their solution must have lain a solid backing of study and research. But, in our brief agricultural career we have done vastly more than grow wheat, and in the matter of other crops corresponding difficulties have been met and overcome in like manner. I need refer to but a few of our most successful ventures. The pastoralist starting with very indifferent material has built up the Australian Merino, which to-day, in its finest representatives, is probably second to none in the world. The great sugar industry of Queensland has had to overcome countless difficulties before attaining its present-day commanding position. Equally remarkable has been the wonderful development of our irrigation areas; of our vine and fruit industries; of our dairying and poultry industries; of the Victorian sugar beet and tobacco industries, &c. Nobody can contend that in a new country these various lines of rural activity could have been raised to economic stability in so brief a period of time without the assistance of much patient research and work.

Such, then, is the case for "utilitarian" Research, in which the work of the men of the fields has perhaps necessarily been more in evidence than that of their brethren of the laboratories. It must not, however, be supposed that the work of the latter lacks of appreciation in our midst, particularly when its bearing on everyday affairs has been made sufficiently clear. Agricultural Research, if it has any meaning, must, I take it, seek a wider audience than those of high scientific attainments: it must ultimately make appeal to the journeymen on whose behalf it is presumably undertaken. And no

inconsiderable personal experience has taught me that in Australia, at all events, farmers are for the most part keenly alive to the value of work of this kind, nor are they slow to show their appreciation of it, if you but gain their confidence. If I stress this point, it is because I am convinced that to flourish in our midst, Agricultural Research must have the backing of those whom it is intended to serve. We recognise the need for continued Research work in all the many phases of rural activity that have hitherto occupied our attention; and we know of others the depths of which we have still to plumb. The question that should concern us most, therefore, should be how best to smooth the way for those whose special duty it will be to engage in future Research. It seems to me that three avenues offer themselves for such energy as we may have available for the purpose; whether we should avail ourselves of all or not, is perhaps a matter for future consideration. I have in mind at the present moment (1) State institutions, (2) private initiative, and (3) the Universities.

Hitherto, apart from the efforts of the men of the fields, it is in State institutions mainly that Agricultural Research has received attention. They suffer, however, from severe disabilities which frequently cripple the effectiveness of such work as may be attempted. Among them we may quote the hampering ties of administrative work, the lack of continuity in general policy, the impatient cry for results and at times political influence. Nevertheless, and notwithstanding these disabilities, it would be folly to rule out State institutions as centres of Research, whenever their occupants come under its inspiration.

Research is so much the matter of the man rather than of his equipment, and of the funds available to him that private initiative in the matter, independent of the control of others, appears to me ideal, when time, circumstances, and the individual meet. I know, for instance, of no more fruitful work in this connection than that of Lawes and Gilbert. But, unfortunately, how often do we find adequate training, adequate appreciation of fundamental questions and adequate enthusiasm and capacity for work suitably combined with adequate personal means? The freedom of choice and action which must accompany such a combination helps to create an atmosphere ideal for the prosecution of Research; and it was largely by its favor that in his laborious life Charles Darwin was able to do what he did. Nevertheless, let us admit the rareness of the circumstances, and recognise that to a very limited degree only can Research be left to private initiative. But when we chance upon it struggling to give

effect to a faith that is within, then surely our interest should be lent towards securing for it public recognition, and if need be, public assistance.

Lastly, we come to the Universities, who here in Australia somewhat tardily, and mayhap somewhat diffidently, are beginning to acquire agricultural interests, and in time, one may hope, will develop a special agricultural policy and outlook of their own. It would seem that very shortly Chairs of Agriculture will be attached to all of our Universities, and we must assume that the claims of Agricultural Research will appeal strongly to their incumbents. As to whether, apart from the few who aspire to purely professional careers, local conditions are as yet ripe for University training in agriculture, there may be room for difference of opinion; but there can be none as to the desirability of the prosecution of Research by the Universities. Indeed, it is perhaps permissible to put the position more emphatically and to maintain that it is the bounden duty of the Universities to make adequate provision for Research. The usual retort is simple and obvious enough, namely, that there are no funds available for the purpose That may well be and may even continue so indefinitely, if we have nothing better to offer than passiveness. Refusal to act on the grounds that funds are inadequate always seems to me to argue but chilly love for Research. If I may be pardoned for raking in a matter of personal experience, I shall state that work done and results achieved under difficulties, eventually act as magnets towards public funds. There is no such thing as wasted effort, if it be but launched in the right direction, and even if it go awry, it is surely better than inaction. Moveover, I have yet to learn that the world's best work has come from the most generously endowed institutions. After all it is the man that counts, not his equipment: and let him but show inclination and power to act and equipment will follow soon enough. I take it, therefore that it is mainly to the Universities that we must look for the future extension of Agricultural Research.

One more point I must make in this connection, which to some, from its very obviousness, may perhaps seem almost superfluous, I hold very strongly that no University should attempt Agricultural Research or Agricultural Education that has not access to ample farm-lands to keep its staff in touch with realities. These lands, in my view, should be immediately controlled by the Professor of Agriculture, whose presence and authority would ensure that Research would take place along agricultural lines. I have the highest respect for the Sciences and realise that Agriculture can make little or no progress without their aid: nevertheless, I feel that in such matters the Sciences are al-

ready securely entrenched and well able to look after their own interests, whenever they have a mind thereto. Agriculture, on the other hand, a new comer, perhaps an intruder in academic circles, is likely to be jockeyed out of its rights, unless its interests are in sympathetic and understanding hands. Hence, my firm conviction that at all times the Head of a University Agricultural Department should be an adequately trained agriculturist.

I am beginning to realise that except by implication I have said little or nothing about Agricultural Education: and time does not now admit of more than brief reference to this important subject. I am compelled, therefore, to confine myself to a few generalities.

I believe that the type of Agricultural Education hitherto adopted by the Australian States has adequately met the general requirements of our special position. In the first place we have recognised that circumstances were such that only the merest fraction of the future tillers of the soil could hope to acquire adequate technical training away from home. Secondly, we have thought it imperative that the few able to attend our Agricultural Colleges should as a matter of every day routine take part in ordinary farm work to the extent of 50 per cent. of their time. It follows that all students have necessarily been boarders, and that numbers in attendance have been strictly limited by the capacity of the College Farm adequately to provide work. It seems probable that in the course of time we shall be compelled to review this practice, particularly if applicants in excess of those that can be accommodated become clamorous for admission. We can, perhaps, legitimately assume that farmers' sons who follow in the wake of College teams are generally wasting their time, and might be occupied more profitably. As a matter of principle they might be definitely excused from farm work of any kind: they might even be enrolled as day boarders: both of which would admit of larger attendances at the Colleges without much additional cost.

The men our Colleges have hitherto turned out have for the most part given good account of themselves on the land, and in many instances in purely professional positions. It is a moot point whether higher University training would help them much in their normal pursuits as farmers, fruit-growers, dairymen, &c., and it is probable that in the main it will be availed of by those only who have in view professional appointments.

I have said nothing of the early training which precedes admission to the Agricultural College, and which in nine cases out of ten represents the only schooling of the ordinary agriculturist. I have said nothing about this training because I cannot bring myself to admit that

we have any right to force specialisation upon children until the very last minute when the final decision must be made. Personally, apart from the question of equipment and teaching facilities I can see no reason why the early education of the country lad should differ essentially from that of his city cousin.

Agriculture, on the other hand, has infinitely greater interest in adult education, extending beyond school walls and reaching out to the man who has already taken up the burdens of life. The Australian States have, I believe, recognised their duties to those who have gone out into the wilderness, and have in various ways endeavoured to give effect to them. State Departments of Expert Officers have been created, publications have been issued, lectures and demonstrations have been given, and settlers have been encouraged to join in local units for the discussion of technical and social matters, &c. No doubt much remains to be done in this direction, and will no doubt be done in the course of time. Speaking, however, for my own State, South Australia, I believe that I can say with confidence that had it not been for these educational efforts, our agricultural progress would have been infinitely slower than it has been; and the same can probably be said of neighboring States.

I feel that I must now bring to a close these somewhat rambling remarks, with the consciousnesss that I have not done justice to two very important subjects. I can, however, comfort myself with the thought that I was not asked to deal with these subjects exhaustively, but merely to present them in such a fashion as to lead to a general discussion. In the circumstances, imperfect treatment of the subject has its advantage in that it affords wider scope for criticism.

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AGRICULTURAL EXPERIMENTS—REPORT FOR THE YEAR 1922-1923.

[By W. J. SPAFFORD, Superintendent of Experimental Work.]

EXPERIMENTS AT BUTLER.

[Conducted by Mr. C. F. Jericho.]

In 1916, wheat-growing experiments were commenced in the hundred of Butler, having as their objects—(1) The discovery of the most profitable dressing of superphosphate to apply to wheat crops in this particular locality; and (2) a comparison of the returns secured from varieties of wheats on bare fallow.

MANURIAL PLOTS AT BUTLER, 1922.

The manurial plots were commenced in 1916, and are permanently pegged, so that each year that the blocks are sown with wheat, each plot will receive exactly the same manuring. This treatment does away with any chance of the plots receiving any benefits from residual fertilisers to which they are not entitled. The more often the plots are cropped the better will they show the effects of the different dressings of manure.

Below will be found the yields of grain received from the wheat grown in the manurial plots in 1922:—

Yields of Manurial Plots—Butler, 1922.

Plot.	Manure per Acre.	Bush.	lbs.
1.	No manure	7	52
2.	½cwt. superphosphate	12	52
3.	1cwt. superphosphate	15	19
4.	2cwts. superphosphate	17	28
5.	3cwts. superphosphate	18	8

Gluyas wheat used in all plots at the rate of 60lbs. seed to the acre.

Yields of Manurial Plots—Butler, 1916-1922.

Year.	Yield per Acre. Plot 1. No Manure. B.	L.	Plot 2. ½cwt. Super. B.	L.	Plot 3. 1cwt. Super. B.	L.	Plot 4. 2cwts. Super. B.	L.	Plot 5. 3cwts. Super. B.	L.	Rainfall. In.
1916	12	12	16	17	16	32	23	32	28	31	15.79
1917	13	30	20	36	23	23	27	48	29	46	20.78
1918	8	8	12	54	14	24	19	53	19	56	9.87
1919	10	14	12	26	15	9	16	42	17	59	10.93
1920	10	42	18	4	23	13	25	20	25	8	14.79
1921	13	27	14	50	16	37	19	11	18	16	19.08
1922	7	52	15	52	15	19	17	28	18	8	11.54
Means	10	52	15	26	17	48	21	26	22	32	14.68

The average returns for the application of various quantities of superphosphate very clearly show the need in the hundred of Butler of what are usually considered comparatively heavy dressings of this form of fertiliser. The following table, however, sets this out much more clearly, and distinctly shows that the use of manure for wheat growing is purely a business proposition—so much increased return for a given outlay. In the calculations, superphosphate is taken at 5s. per hundredweight, and wheat valued at 3s. 3d. per bushel:—

Increased Yields and Net Increased Value of Wheat from the Use of Superphosphate—Butler, 1916-1922.

Manuring per Acre.	Yields, 1916-1922.	Increased Yields over no Manure.	Net Value of Increase. per Acre.
	B. L.	B. L.	£ s. d.
No manure	10 52	—	—
½cwt. superphosphate	15 26	4 34	0 12 4
1cwt. superphosphate	17 48	6 56	0 17 6
2cwts. superphosphate	21 26	10 34	1 4 4
3cwts. superphosphate	22 32	11 40	1 2 11

Wheat Variety Tests at Butler.

Besides the manurial plots mentioned above, Mr. Jericho is conducting wheat variety tests, each variety being sown on land that was in bare fallow, at 1bush. per acre, with 2cwts. superphosphate. In the table arranged below will be found the yields from the wheat varieties grown at the hundred of Butler for 1918-1922:—

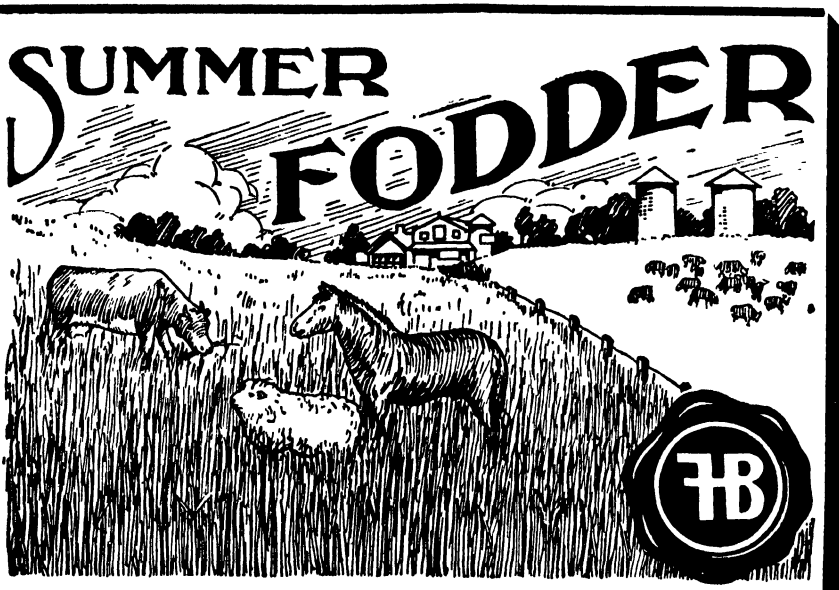
Yields of Wheat Varieties—Butler, 1918-1922.

Variety.	Yield per Acre. 1918.	1919.	1920.	1921.	1922.	Means, 1918-1922.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
Gluyas	16 42	14 22	19 1	20 2	17 30	17 31
Caliph	12 24	16 31	12 51	18 50	15 53	15 18
Late Gluyas	—	—	—	25 30	15 34	—
Ford	—	—	—	—	15 42	—
Felix	—	—	—	—	14 3	—
Sultan	—	—	—	—	13 56	—
College Eclipse	14 23	16 36	15 22	19 24	—	—
Queen Fan	10 38	15 40	11 58	22 21	—	—
Canaan	—	—	12 30	19 19	—	—
Rainfall	9.87in.	10.93in.	14.79in.	19.08in.	11.54in.	13.24in.

EXPERIMENTS AT YEELANNA.

[Conducted by Mr. I. J. Williams.]

In 1918 arrangements were made with Mr. I. J. Williams, of Yeelanna, to have experimental plots carried out on his farm, and it was decided that manurial plots and a rotation of crops experiment should be conducted there. As some of the plots were to be sown on



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SUNFLOWER	PEANUTS	BUCKWHEAT

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fallow, the land had to be prepared that year, and the first crops were sown in 1919. The experiments arranged consist of:—(1) Manurial plots, testing different forms of phosphate fertilisers, and (2) rotation of crops.

Manurial Plots at Yeelanna.

The manurial experiment consists of 10 1-acre plots, five of which are sown to wheat each year, and the remainder are bare fallowed. The plots are permanently pegged, and so worked that each time every individual plot is in crop, it receives the same manuring. The yields of grain received from these plots since their inception—1919 to 1922—are set out below:—

Yields of Manurial Plots—Yeelanna, 1919-1922.

Plot.	Manuring per Acre.	1919. B.	1919. L.	1920. B.	1920. L.	1921. B.	1921. L.	1922. B.	1922. L.	Means, 1919-1922. B.	Means, 1919-1922. L.
1.	1cwt. suprephosphate ..	21	27	14	0	26	0	5	35	16	45
2.	1cwt. basic slag	7	30	11	23	5	2	Failure		5	59
3.	1cwt. bonedust	1	50	9	59	3	30	Failure		3	50
4.	1cwt. super, 5cwts. lime .	7	40	13	4	14	6	4	22	9	48
5.	No manure	1	56	7	20	3	30	Failure		3	11

The returns secured from these manurial plots certainly show some startling differences, and at present it appears that something other than the kinds of phosphates used on the various plots is having an influence on the results. What the reason of these marked variations is, it is impossible to say, because nothing connected with these experimental plots, likely to explain the differences, was noticeable. The crops have been more or less badly affected by "take-all" *Ophiobolus graminis*) in each of the four seasons, and if the manurial treatment given to Plot 4 had not been included in this series of experiments, it would have appeared that superphosphate was controlling the ravages of this disease of wheat, better than the other forms of phosphates, but there is too great a discrepancy between the results secured from Plots 1 and 4 for this to be a full explanation.

ROTATION PLOTS—YEELANNA.

The rotation of crops experiment at Yeelanna is a four-course series with 5-acre plots, in which two cereal crops are the only ones carted off the land, and is as follows:—Oats, rape, bare fallow, wheat. During its course this rotation has worked out as is shown below:—

Plot.	1919.	1920.	1921.	1922.
1	Oats	Rape	Fallow	Wheat
2	Rape	Fallow	Wheat	Oats
3	Fallow	Wheat	Oats	Rape
4	Wheat	Oats	Rape	Fallow

Wheat—2cwts. superphosphate per acre.

Oats—1cwt. superphosphate per acre.

Crops in Rotation Plots, 1919-1922.

Year.	Wheat with 2cwts. Superphosphate.		Oats with 1cwt. Superphosphate	
	B.	L.	B.	L.
1919	20	1	22	6
1920	10	44	16	20
1921	14	24	18	23
1922	22	52	9	10
Means	17	0	16	25

EXPERIMENTS AT SMOKY BAY.

[Conducted by Mr. E. Lovelock].

At the request of the Smoky Bay Branch of the Agricultural Bureau a series of manurial experiments with wheat was arranged for that district, to be conducted in conjunction with the Department of Agriculture by Mr. E. Lovelock. The soils of this district consist mainly of calcareous sands, with the reputation of being so rich in phosphoric acid that phosphatic fertilisers are unnecessary for the production of maximum crops of the cereals.

An investigation of a sample of soil taken at the time of starting these plots showed on analysis:—

Total silica (SiO_2)	8.84 per cent.
Lime (CaO)	45.85 per cent.
Potash (K_2O)	0.019 per cent.
Phosphoric acid (P_2O_5)	0.085 per cent.
Organic carbon (C)	1.54 per cent.
Nitrogen (N)	0.094 per cent.
Manganese (Mn_3O_4)	0.010 per cent.
Chlorides (as sodium chloride)	0.016 per cent.

Since the above soil sample was submitted for analysis, a number of other samples were taken, and the most important mineral plant foods have been determined as follows:

Soil Samples from Smoky Bay, 1922.

Sample.	Description.	Depth.	Nitrogen (N)	Phosphoric Acid (P_2O_5)	Potash (K_2O)	Lime (CaO)
		In.	%	%	%	%
1.	Top of rise where soil is only about 5in. deep, and resting on limestone. Most crops grown here have been poor.	0–5	0.007	0.109	Nil	46.4
2.	Fair average soil of the district: has not been dressed with superphosphate for at least 10 years.	0–6	0.108	0.109	Trace	43.7
2B.		6–12	0.073	0.092	Trace	44.9
3.	From bare patch which grows poor crops: has appearance of being old rabbit warren.	0–6	0.078	0.092	Trace	45.0
3B.		6–12	0.048	0.107	Trace	45.8
4.	Fair average soil of district	0–6	0.113	0.106	Trace	42.8
5.	From fertile hollow between sandhills: similar hollows grow most crops really well.	0–6	0.277	0.146	0.115	40.3
5B.		6–12	0.210	0.180	0.150	40.4

These results show the average soil to be a calcareous sand, very deficient in potash, but, compared to average South Australian soils, comparatively rich in phosphoric acid and nitrogen, and so it was decided to arrange the trials with manurial dressings, as is set out below, conducting the experiments on the three-course rotation of (1) bare fallow, (2) wheat (manurial plots), (3) oats.

Manurial Experiments—Smoky Bay, 1922.

Plot.	Manuring per Acre.	Yield per Acre. B.	L.
1.	1cwt. superphosphate	19	19
2.	½cwt. superphosphate	18	55
3.	½cwt. muriate of potash	14	35
4.	1cwt. super and ½cwt. muriate of potash	18	39
5.	No manure	15	4
6.	2cwts. superphosphate	20	48
7.	2cwts. super and 1cwt. muriate of potash	20	33

OATS AT SMOKY BAY, 1922.

The oat crop is grown without fertiliser of any kind, so that there will be no residual effect of manure on the wheat plots when the land is next brought under the wheat crop; but the oat crop naturally receives benefits from any fertiliser which was not used by the preceding wheat crops, and as the yields secured from all the manurial plots were kept separate, they serve to show the residual effect of the manures for this year, and are as follows:—

Oaten Hay Crop—Smoky Bay, 1922.—*Oats Sown without Manure.*

Plot.	Fertiliser used per Acre on Preceding Wheat Crop in 1921.	Area. Acres.	Yield per Acre. T.	C.	L.
1.	No manure	1	1	0	71
2.	½cwt. superphosphate	2	1	0	31
3.	1cwt. superphosphate	1	1	3	22
3A.	1cwt. super and ½cwt. muriate of potash	1	1	4	25
4.	2cwts. superphosphate	2	1	5	51
5.	3cwts. superphosphate	2	1	6	109
	Means	9	1	3	81

EXPERIMENTS AT COONALPYN.

[Conducted by Mr. F. Tregenza.]

In 1919 a series of rotation of crops experiments was laid down for the Coonalpyn Branch of the Agricultural Bureau on Mr. Tregenza's farm. These have as their main objects—(1) the control of "take-all," which at present plays havoc in the wheat crops of the district, and (2) increasing the livestock-carrying capacity of the land. For the purpose a five-course rotation was adopted, consisting of five plots each

five acres in extent, to be worked on the system of bare fallow-wheat-oats-pasture-pasture. The wheat and the oat crops are being dressed with 1cwt. superphosphate per acre, and the grazing crop consists of a mixture of 10lbs. Wimmera rye grass, 2lbs. Subterranean clover, and 2lbs. rape per acre, sown without manure after the oat stubble has been lightly cultivated. The plots have now carried three crops of each of the cereals—wheat and oats—and have given the returns set out in the following table:—

Cereal Crops in Rotation Plots—Coonalpyn, 1920-1922.

Year.	Yield per Acre. Wheat. B.	L.	Oats. B.	L.
1920	*4	29	16	9
1921	21	5	23	26
1922	12	49	10	36
Means	13	28	16	37

* The wheat crop for 1920 is only a calculated yield; the crop was cut for hay, and produced 10cwts. 30lbs. per acre, and on the figures found to apply at Roseworthy Agricultural College that (1) the "total produce" of wheat crops equals about 82 per cent. of the "hay" weight, and (2) there are about 3½lbs. of "total produce" to every 1lb. of grain, the above yield was estimated.

Sown Pasture at Coonalpyn.

Each season, after the oat crop has been harvested, the stubble is grazed, the land is cultivated just sufficiently well to enable small seeds to be covered, and a mixture consisting of 10lbs. Wimmera rye grass, 2lbs. Subterranean clover, and 2lbs. rape is broadcasted to the acre without manure, and harrowed. This grazing crop is pastured for two consecutive seasons, then the land is bare-fallowed in preparation for a wheat crop. The results secured from these pasture plots are to be seen in the next table:—

Grazing of Sown Pasture—Coonalpyn, 1921-1922.

Year.	Sheep per Acre per Year. *First Year Grazing.	†Second Year Grazing.	Average Animal Grazing.
1921	1.33	0.79	1.06
1922	1.67	1.82	1.74
Means	1.50	1.30	1.40

* From harvest of oat crop to March 31st of next year.
† From April 1st to March 31st of next year.

Fodder Crops at Coonalpyn.

Besides the rotation of crops experiments dealt with above, Mr. Tregenza has also conducted a series of plots in which various fodder plants are compared one with the other. Each of these plots is about

one-eighth of an acre in area, and the fodders shown below were seeded early in 1920, and have only been grown for demonstration purposes.

Tall Fescue (Festuca elatior).—This grass did not germinate well, and the few plants present did not compete at all well with the ordinary weeds of the district. In April, 1923, the plot was reseeded with *Rib grass* (Plantago lanceolata).

Cocksfoot (Dactylis glomerator).—A good germination was received from this grass, and in 1920 it grew to at least 2ft. 6in. in height, was very fair in 1921, and made good growth in 1922.

Creeping Bent (Agrostis stolonifera).—Very few plants germinated, and, although they made fair growth, the plot was so irregular and patchy that it was reseeded to the same grass in April, 1923.

Wallaby Grass (Danthonia semi-annularis).—Fair to good growth was made by this grass in 1920, 1921, and the spring of 1922, but by the end of the season it had thinned out so considerably that the plot was resown to *Birdsfoot Trefoil* (Lotus corniculatus) in early April, 1923.

Perennial Canary Grass (Phalaris bulbosa).—Although a good germination was made by this grass, followed by very fair growth in the first year, it quickly became too thin a crop to be worth carrying on, so the plot was reseeded in early April, 1923, with *King Island Melilot* (Melilotus indica).

Yorkshire Fog (Holcus lanatus).—The seed germinated well, and the plants have made really good growth in each of the three seasons since seeding.

Paspalum Dilatatum.—This was established by planting rooted sections about 3ft. apart each way in the spring of 1920, and a good stand resulted, and the plants have made strong growth each season.

Prairie Grass (Bromus unioloides).—This grass did not last long, and by 1922 was so thin that it was replaced by *Sheep's Burnet* (Poterium sanguisorba) in April, 1923.

Perennial Rye Grass (Lolium perenne).—The rye grass has made good growth, right from germination onwards, to the exclusion of all weeds, and is still good.

Sweet Clover (Melilotus alba).—The germination of the seed was a little irregular, but the plants made very fair growth in both 1920 and 1921, and in 1922 made remarkably good growth. The plot was reseeded with this sweet clover in April, 1923.

Perennial Red Clover (Trifolium pratense perenne).—The germination of seed was not good enough to give a thick stand of plants, but those present have made fairly good growth each season. The plot was reseeded to this same clover in April, 1923.

Yellow Trefoil (Medicago lupulina).—Although this Medick made good growth for the first two seasons, it did not establish itself too well for the next year, and, being really thin, it was reseeded in April, 1923.

Alsike Clover (Trifolium hybridum).—The seed germinated well, and, although the plants made very fair growth, the weeds were getting the upper hand by the end of 1922, and so the plot was reseeded with the same clover in early April, 1923.

Lucerne (Medicago sativa).—The crop has made fair growth each year, but most plants have been rather short and spindly, with just an occasional vigorous plant.

EXPERIMENTS AT YURGO.

[Conducted by Mr. H. Sanders.]

The Nunkeri and Yurgo Branch of the Agricultural Bureau approached the Department of Agriculture in 1920 with a request that experimental plots be conducted in that district, on the farm of Mr. H. Sanders, of Yurgo. After an inspection of the district, and a conference with members of the Agricultural Bureau Branch, it was finally decided to conduct—(*a*) rotation-of-crops experiment, having as its main object the carrying of sheep, (*b*) wheat manurial plots, (*c*) small fodder plots for demonstration purposes.

The soils of the Yurgo district consist mainly of two types, the ridges being composed of sandy soils of light texture and light color, with the hollows containing good red-colored loam, and the rotation-of-crops experimental block was selected to contain about one-fifth of the sandy high land and about four-fifths of red loam. Samples taken from these two types of soil were analysed by the Department of Chemistry, with the following results:—

Soil Samples from Yurgo.

	Red Soil of Hollows.		Sandy Soil of Hills.	
	0–6in.	6–12in.	0–6in.	6–12in.
	%	%	%	%
Phosphoric acid (P_2O_5)	0.030	0.014	0 032	0.004
Potash (K_2O)	0.118	0.666	0.002	0.013
Nitrogen (N)	0.034	0.040	0.017	0.020
Organic carbon	0.84	0.56	0 48	0.40
Lime (CaO)	0.196	4.020	0.154	0.050
Chlorides	0.005	0.047	0.001	0.006
Manganese (Mn_3O_4)	0.004	0.013	0.004	0.002
Total silica	84.1	57.0	97.0	96.0
Soil reaction	Alkaline	Alkaline	Very faintly alkaline	Neutral

Yurgo Rotation-of-Crop Experiment.

As the farmers, of which the Nunkeri and Yurgo Branch of the Agricultural Bureau is composed, desired a rotation of crops which would reduce the amount of cropping and increase the livestock carrying capacity of the land, a five-course rotation on six-acre plots was arranged as follows:—

Year.	Block A.	Block B.	Block C.	Block D.	Block E.
1922	Wheat (plots)	Fallow	Wheat	Lucerne	Lucerne
1923	Lucerne	Wheat (plots)	Fallow	Lucerne	Lucerne
1924	Lucerne	Lucerne	Wheat (plots)	Fallow	Lucerne
1925	Lucerne	Lucerne	Lucerne	Wheat (plots)	Fallow
1926	Fallow	Lucerne	Lucerne	Lucerne	Wheat (plots)
1927	Wheat (plots)	Fallow	Lucerne	Lucerne	Lucerne

Wheat—60lbs. seed per acre; manurial plots.
Lucerne—6lbs. seed per acre; no manure.

Yurgo Manurial Plots with Wheat.

As manurial experiments were also wanted by local farmers, it was decided that the plot carrying wheat would, each season, be divided up into six smaller plots, and receive different manurial dressings. The plots arranged, and the yields secured from each for this, the first year, are set out below:—

Manurial Plots with Wheat—Yurgo, 1922.

Plot.	Manuring per Acre.	Yield per Acre. B.	L.
1.	No manure	9	9
2.	1cwt. superphosphate	26	24
3.	½cwt. super and 5cwts. lime	20	10
4.	1cwt. super and 5cwts. lime	25	19
5.	2cwts. super and 5cwts. lime	24	7
6.	3cwts. super and 5cwts. lime	24	20

Grazing of Rotation Plots—Yurgo, 1922.

This being the first year of these rotation-of-crops experiments at Yurgo, both Block D and Block E were seeded to lucerne at the rate of 6lbs. of seed per acre, and they were grazed together as one block, the livestock carried being equivalent to 1.26 sheep per acre per year for each block, for the "First Year Grazing," which is taken to March 31st, 1923.

Fodder Crops at Yurgo.

Small blocks of very sandy land, between quarter acre and half acre in extent, have been seeded with various fodder plants, as demonstration plots, and the crops tried behaved somewhat as follows in 1922:—

Lucerne (2lbs. seed per acre).—Very thin and uneven, and the plot has not supplied much grazing.

Lucerne (*4lbs. seed per acre*).—Fairly good stand, but the plants are not vigorous.

Lucerne (*6lbs. seed per acre*).—Good, thick stand, but, like the previous plots, the lucerne plants have not made vigorous growth on this sand.

Subterranean Clover (Trifolium subterraneum).—This clover has made healthy, strong growth of a rich green color, and is very promising as a fodder crop for these particular conditions.

King Island Melilot (Melilotus indica).—Although the germination of the seed was good, the plants did not make strong growth.

Buffalo Grass (Stenotaphrum americanum).—Did not produce a good stand owing to dryness of rooted sections.

Rhodes Grass (Chloris gayana).—Hardly a plant resulted from the rooted sections transplanted.

Wimmera Rye Grass (Lolium subulatum).—This grass germinated well, and produced a strong, heavy mass of growth, to the exclusion of all weeds.

Wallaby Grass (Danthonia semi-annularis).—This grass did not make very strong growth, but withstood the summer weather.

Besides the above fodder-crop plots, small lots of Woolly Top (*Pennisetum villosum*) Kikuyu grass (*Pennisetum longistylum*), and many-flowered millet grass (*Oryzopsis miliaceum*) were tried, all of which took root, and have made some growth.

EXPERIMENTS AT WINDSOR.

[Conducted by Mr. S. D. White.]

At the request of the Windsor Branch of the Agricultural Bureau, experimental plots testing wheat varieties on fallowed land were inaugurated on the farm of Mr. S. D. White, of Windsor. All varieties were drilled in with 2cwts. superphosphate per acre in the same field, and gave the following returns per acre:—

Wheat Variety Yields—Windsor, 1922.

Variety.	Area. Acres.	Yield per Acre. B.	L.
Felix	3.03	27	32
Ford	3.03	25	57
Sultan	3.03	20	47
King's Red	3.03	19	57
Gluyas	3.03	19	32
Florence	3.03	17	27

ORCHARD NOTES FOR SOUTHERN DISTRICTS FOR SEPTEMBER, 1923.

[By C. H. BEAUMONT, Instructor and Inspector.]

Ploughing should be completed as early as possible and the trees should be cleaned around, especial care being taken not to allow the soil to become heaped up close to the butts.

Do not allow any cuttings to remain about the orchard.

If you intend to use fertilisers, do it now. Drill in 2cwts. to 3cwts. of bonedust or complete orchard manure.

Plant citrus trees; the method is the same as that described for other trees. Be sure that the trees are free from disease and weeds.

Spraying begins in earnest this month, and all trees liable to fungus pests must be carefully sprayed with Bordeaux or Burgundy mixture.

Use red oil emulsion for lessening red spider. This mixture will also assist in checking woolly aphis. Peach aphis is best treated with Black Leaf 40 or a decoction of tobacco with a little resin wash in it.

Watch the strawberry plants for mildew. If the disease is found, treat it with lime sulphur solution or with flowers of sulphur. Spray with arsenate of lead for cut worms.

When planting tomatoes, use only strong, well grown plants.

Fruit trees and vines should be grafted.

Go carefully through the fruit in cool store, only the best and firmest should be retained.

THE AGRICULTURAL VALUE OF FERTILISERS.

A number of questions, bearing on the value of different forms of fertilisers, submitted by a farmer at Myponga, were replied to recently by the Superintendent of Experimental Work (Mr. W. J. Spafford) in the following terms:—

1. *Is the acid-soluble phosphate in rock phosphate of the same value as the acid-soluble phosphate in bonedust?*

Although the acid-soluble phosphate in both rock phosphate and bonedust is the same chemical substance (tri-calcic phosphate) it has slightly different agricultural value in these two forms. At the

present price of £3 10s. a ton for rock phosphate containing 57 per cent. tri-calcic phosphate, the unit value (each per cent. per ton) is just under 1s. 3d.—arrived at by dividing £3 10s. by the 57 per cent.—and when tri-calcic phosphate in rock phosphate is worth 1s. 3d. per unit, the same substance in bonedust or any other organic manure is worth from an agricultural point of view about 1s. 9d. per unit. In other words, 10lbs. of the acid-soluble phosphate in bonedust is about equal to 14lbs. in raw rock phosphate. In very "sour" soils this ratio is reduced and the two forms become nearer of one value.

2. *By the addition of a nitrogenous manure to rock phosphate could I make a fertiliser of equal value to bonedust containing.* 40 *per cent. acid-soluble phosphate and* 3.25 *per cent. nitrogen?*

If 40lbs. of tri-calcic phosphate in bonedust equals 56lbs. in rock phosphate, a mixture of 98lbs. of raw rock phosphate containing 57 per cent. acid-soluble phosphate and 16.25lbs. of sulphate of ammonia containing 20 per cent. nitrogen would be approximately of equal agricultural value to 100lbs. of bonedust containing 40 per cent. tri-calcic phosphate and 3.25 per cent. nitrogen. To make a fertiliser of the above mixture equal both in agricultural value and weight, with the bonedust mentioned, you would need 83.75lbs. raw rock sulphate containing almost 67 per cent. acid-soluble phosphate and 16.25lbs. sulphate of ammonia containing 20 per cent. nitrogen.

3. *Does rock phosphate contain plant food in the same way as bonedust, or is it only a soil sweetener?*

All of the phosphoric acid contained in the rock phosphate is plant food, and if applied to the soil will eventually be collected by plants in the same way as will that substance in the bonedust, and the only difference in the two forms rests on the fact that soil bacteria act more readily on the organic form than on the inorganic, so liberating the phosphoric acid sooner. It is because of this fact that acid-soluble phosphates in organic manures have a higher agricultural value than in rock phosphate.

4. *Are manures containing acid-soluble phosphate as well as water-soluble phosphate more suitable for this district with a* 29*in. average annual rainfall?*

5. *Would it be advisable to try rock phosphate in this district?*

At the present prices of the various phosphatic fertilisers on our market you will get best money returns from annual crops by using superphosphate. If you wish to manure pasture lands, then you would think of using acid-soluble phosphate as well as the water-soluble form.

6. *When should acid-soluble phosphate be applied, in the autumn or in the spring?*

You would only use acid-soluble phosphate for perennial crops and pastures, and then best results would be secured by applying it in the autumn.

EXPERIMENTAL FARM HARVEST REPORTS.

VEITCH'S WELL EXPERIMENTAL FARM.

[By L. SMITH, Manager.]

This farm is situated in the hundred of Allen, 158 miles from Adelaide, on the Loxton Railway. It consists of about 3,800 acres of land, the bulk of which is sandy, the remainder running to shallow light-loam soils overlying hard limestone rock—conditions similar to thousands of acres of surrounding country.

THE SEASON 1922.

The returns from the cereal crops, as set out below, show that the season was an average one. The total rainfall was 10.28in., of this 8.69in. could be regarded as rain useful to the growing crop The bulk of the seed was put in dry during April and May, and germinated well after the first rains. All cereals were promising more than average returns up till the end of September, but a dry October considerably reduced the yields. The distribution of the rainfall for the year, together with that for each year since 1917, is set out in the table below:—

Rainfall Distribution—Veitch's Well, 1909-1922.

	Means, 1909-1916.	1917.	1918.	1919.	1920.	1921	1922	Means, 1909-1922.
	In.	In.	In.	In.	In	In.	In.	In.
January	0.34	0.45	0.07	0.20	0.10	1.61	0.48	0.40
February	0.89	2.60	0.23	5 49	—	0.97	0.09	1.18
March	1.44	0.78	0.49	0.36	0.33	1.24	—	1.05
April	0.28	0.24	1.00	0.26	0.33	0.06	0.89	0.36
May	1.34	1.15	1.31	1.88	1.45	2.19	3.06	1.55
June	1.71	1.01	1.08	0.37	1.29	0.78	1.21	1.39
July	1.16	1.14	1.39	0.29	0.79	0.91	0.91	1.05
August	1.38	1.91	2.36	0.53	2.19	1.28	0.70	1.43
September	1.94	2.01	0.22	0.76	3.10	1.54	1.10	1.73
October	0.79	2.38	0.98	0.45	3.66	0.45	0.73	1.07
November	1.07	1.72	0.07	0.62	0.95	1.03	0.09	0.93
December	0.73	1.21	—	2.03	1.31	0.30	1.02	0.84
Total	13.07	16.60	9.20	13.24	15.50	12.36	10.28	12.98
"Useful" rain (April-November)	9.67	11.56	8.41	5.16	13.76	8.24	8.69	9.51

The distribution of the "useful" rainfall is set out in the next table. The amount gauged is shown to be a little below the average, although fair seeding and winter rains fell.

	1922.	Means, 1909-1922.
	In.	In.
Seeding rains (April-May)	3.95	1.91
Winter rains (June-July)	2.12	2.44
Spring rains (August-October)	2.53	4.23
Early summer rains (November)	0.09	0.93
Total "Useful" rainfall ..	8.69	9.51

Crops.

In the fields, cereals were the only crops grown. In small blocks near the homestead, lucerne and Wimmera rye grass gave good feed.

Hay Crops.—A block containing 20.46 acres of Baroota Wonder wheat in Field No. 11, and also 8.98 acres of Algerian oats in Field No. 11, were the only areas sown solely for hay. From these, and 13.5 acres of headlands—a total hay area of 42.94 acres—60 tons of hay were cut, an average yield of 1 ton 7cwts. 106lbs. per acre.

The following table sets out hay crops harvested at Veitch since 1910:—

Hay Returns—Veitch's Well, 1910-1922.

Year	Rainfall Total	Rainfall "Useful"	Area.	Total Yield.			Yield per Acre.		
	In.	In.	Acres	T.	C.	L.	T.	C.	L.
1910	16.91	10.15	82.00	82	0	0	1	0	0
1911	13.36	7.28	121.50	74	18	0	0	12	37
1912	12.16	10.87	218.00	109	0	0	0	10	0
1913	14.95	8.27	140.00	70	0	0	0	10	0
1914	6.24	3.66	100.00	Total failure.					
1915	9.83	8.79	158.00	180	0	0	1	2	88
1916	16.69	15.29	127.08	243	0	0	1	18	27
1917	16.60	11.56	69.01	110	0	0	1	11	98
1918 .	9.20	8.41	78.89	93	16	0	1	3	87
1919 . ..	13.24	5.16	109.88	45	0	0	0	8	21
1920 ..	15.50	13.76	122.21	220	0	0	1	16	0
1921 .	12.36	8.24	65.59	90	0	0	1	7	49
1922 ..	10.28	8.69	42.94	60	0	0	1	7	106
Means . .	12.87	9.24	—	—			1	0	74

The season's yield is above the average, and its inclusion in the mean for the farm brings that figure up to 1 ton 0cwt. 74lbs. per acre for the 13-year period 1910-1922

Oat Crops.—All told, 84.89 acres of oats were harvested for grain. These were sown in Fields No. 11 and No. 5, being drilled in on fallow between April 3rd and 15th at the rate of 40lbs. of seed to the acre, with 1cwt. of superphosphate. Field No. 11 was fallowed August 8th to 30th, cultivated September 12th to 30th, cultivated March 17th to 21st; and finally harrowed after seeding. Field No. 5 was fallowed

July 11th to August 6th, cultivated September 12th to October 5th, cultivated March 21st to 27th; and finally harrowed after seeding. The results secured are set out below:—

Oat Variety Yields—Veitch's Well, 1922.

Variety.	Area. Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
Smyrna	3.09	87 6	28 8
Rua Kura	3.09	68 28	22 9
Kelsall's	3.07	58 21	19 2
Kherson	3.32	61 21	18 21
Lachlan	1.09	19 19	17 35
Early Burt	3.09	40 15	13 3
Scotch Grey	31.33	377 0	12 1
Algerian	36.81	163 30	4 18
Farm average	84 89	876 20	10 13

Of the oat varieties tried on this farm Algerian has been considered the most reliable yielder for hay and grain. Early Burt has only been tried for one year, and was unfortunate in striking a very heavy storm when within a day of being ripe. It is a most promising variety for both hay and grain. Smyrna is also a variety that may do well for grain.

The inclusion of this season's return in the mean oat yield of the farm reduces it from 18bush. 33lbs. for six years to 17bush. 25lbs. for seven years, 1916-1922.

The yields for the past seven years are set out in the following table:—

Oat Returns—Veitch's Well, 1916-1922.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
1916	16.69	15.29	12.39	478 37	38 26
1917	16.60	11.56	50.19	1,396 35	27 33
1918	9.20	8.41	40.43	253 24	6 11
1919	13.24	5.16	39.17	379 12	9 27
1920	15.50	13.76	157.08	2,110 37	13 18
1921	12.36	8.24	36.30	623 30	17 7
1922	10.28	8.69	84.89	876 20	10 13
Means	13.41	10.16	—	—	17 25

Barley Crops.—The barley crops harvested for grain were grown part on new ground and part on fallow. The fallowed area was 54.69 acres and new ground 17.55 acres. The new ground was skim ploughed and drilled May 9th to 13th with quantative seed plots, and had a dressing of 1cwt. of superphosphate.

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The fallowed area under barley was 28.14 acres of Experimental Block C, and an area of 26.55 acres in Field No. 3D. This field, 3D, was fallowed very late, October 6th to 12th, seeded at the end of May with 1bush. of seed and 1cwt. super., and harrowed after being drilled.

The yield obtained, together with the farm average for the year, is detailed in the following table:—

Barley Variety Yields—Veitch's Well, 1922.

Variety.	Area. Acres.	Total Yield. Bush. lbs	Acre Yield. Bush. lbs.
Tunis 1	26.55	261 0	9 42
Tunis 4 (seed plots)	17.55	147 0	8 19
Tunis 4 (exp plots)	28.14	539 38	19 9
	72.24	947 38	13 6

The dry nature of the ripening period showed ill effects on the sample and yield. Well-worked fallow yielded 19bush. 9lbs

The next table gives details of the barley crops grown on this farm since 1915:—

Barley Returns—Veitch's Well, 1915-1922.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. Bush. lbs.	Yield per Acre Bush. lbs.
1915 .	9.83	8.79	22.72	248 9	10 46
1916 .	16.69	15.29	20.10	517 20	25 37
1917 ..	16.60	11.56	44.03	1,104 10	25 4
1918	9.20	8.41	49.68	305 5	6 7
1919	13.24	5.16	83.18	185 46	2 12
1920	15.50	13.76	73.20	2,232 48	30 25
1921	12.36	8.24	69.81	1,077 28	15 21
1922 .	10.28	8.69	72.24	947 38	13 6
Means ..	12.96	9.99	—	—	16 7

The mean yield of 16bush. 7lbs. is not a high one for barley, but it is the best yielding cereal we have for bulk feed for pigs.

Wheat Crops.—Other than in experimental plots, all wheat crops were grown in Fields Nos. 5, 10, 11, and 3D. The fallow land in Nos. 5 and 11 was turned up in July and August, was cultivated in September and March, and seeded early in May with 60lbs. of seed and 1cwt. of superphosphate per acre. Field No. 3D was fallowed early in October, and seeded at the end of May. Field No. 10 was new ground. It was skim ploughed before being drilled, and was seeded with 60lbs. of seed and 70lbs. of superphosphate per acre on May 7th to 13th.

The yields obtained from all varieties grown are detailed in the next table:—

Wheat Variety Yields—Veitch's Well, 1922.

Variety	Field Grown. No.	Area Acres	Total Yield. Bush. lbs.	Yield per Acre Bush. lbs.
President	5	1.11	18 11	16 23
Walker's Wonder	5	2.75	41 26	15 4
Sultan	5	2.78	40 48	14 41
Canaan	5	2.22	31 43	14 17
Queen Fan	11	14.77	208 0	14 5
Triumph	5	39 88	558 16	14 0
Rajah	5	3.25	42 7	12 58
Late Gluyas	5	42.39	548 46	12 57
Sultan (selection 4)	5	3 22	40 39	12 37
Emperor	5	1.07	12 43	11 53
Fortune	5	3 25	34 26	10 36
Cumberland	5	29.33	301 20	10 16
Federation	5	7.42	75 41	10 12
Felix	5	3.25	33 7	10 11
Red Russian	11	27 59	253 0	9 10
Baroota Wonder	5	10 33	383 23	9 30
Maharajah	5	3 25	29 30	9 5
King's Red	11	7 99	63 58	8 0
Unknown (ex Minnipa)	5	2 43	19 16	7 56
Caliph	3D	44.75	312 20	7 39
Baroota Wonder (Sel 1)	5	3 22	24 19	7 42
Mixture	10	10.77	58 58	5 29
Early Gluyas	10	72.28	330 36	4 34
Yandilla King	11	26 14	291 12	11 8
Baroota Wonder	Exp	4 26	74 11	17 25
Baroota Wonder	Exp	28.14	361 8	12 50
Farm average	--	427 81	4,219 34	9 52

The yields recorded are slightly below the average The varieties sown on "new ground" considerably reduced the yield. The varieties showing to advantage are President, Walker's Wonder, Sultan, Canaan, Queen Fan, and Triumph. Including this year's yield, the farm average now stands at 10bush. 53lbs.

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The next table gives details of the wheat crops grown on the farm since 1909:—

Wheat Returns—Veitch's Well, 1909-1922.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
1909	14.41	13.04	22.00	396 0	18 0
1910	16.91	10.15	197.50	2,156 0	10 55
1911	13.36	7.28	620.90	5,080 30	8 11
1912	12.16	10.87	569.00	5,544 18	9 45
1913	14.95	8.27	791.40	4,742 28	6 0
1914	6.24	3.66	951.00	325 30	0 21
1915	9.83	8.79	602.11	6,681 51	11 6
1916	16.69	15.29	407.74	7,102 20	17 25
1917	16.60	11.56	469.91	7,156 50	15 14
1918	9.20	8.41	287.89	1,905 28	6 37
1919	13.24	5.16	263.62	1,419 32	5 23
1920	15.50	13.76	287.52	6,384 55	22 12
1921	12.36	8.24	553.61	6,256 18	11 18
1922	10.28	8.69	427.84	4,219 34	9 52
Means	12.98	9.51	—	—	10 53

Although the average yield of 10bush. 53lbs. per acre is not very high, it is quite satisfactory for these particular conditions. With well-worked fallow land, clear of stumps, much better returns can be expected.

The behaviour of the majority of varieties of wheats grown on this farm since 1918 is shown in the table below:—

Yields of Varieties of Wheat—Veitch's Well, 1918-1922.

Variety.	1918. B.	1918. L.	1919. B.	1919. L.	1920. B.	1920. L.	1921. B.	1921. L.	1922. B.	1922. L.	Means, 1918-22. B.	Means, 1918-22. L.
Red Russian	14	45	7	36	27	8	7	14	9	10	13	11
Yandilla King	10	35	3	18	25	10	11	37	11	8	12	22
Queen Fan	2	54	4	36	26	18	13	14	14	5	12	13
Baroota Wonder	5	30	6	7	26	13	11	23	11	6	12	4
Fortune	9	18	9	6	16	56	9	49	10	36	11	9
Gluyas Early	9	53	6	44	19	19	14	56	4	34	11	5
Cumberland	8	29	5	10	18	47	10	11	10	16	10	35
Federation	4	9	4	38	23	2	10	12	10	12	10	27
Late Gluyas	3	40	2	13	19	43	11	43	12	57	10	3
King's Early	5	9	4	34	17	25	7	59	8	0	8	37
Caliph	—		7	50	25	28	11	53	7	39	—	
Triumph	—		—		14	22	13	25	14	0	—	
President	—		—		—		—		16	23	—	
Walker's Wonder	—		—		—		—		15	4	—	
Sultan	—		—		—		—		14	41	—	
Canaan	—		—		—		—		14	16	—	
Rajah	—		—		—		—		12	58	—	
Emperor	—		—		—		—		11	53	—	
Felix	—		—		—		—		10	11	—	
Maharajah	—		—		—		—		9	5	—	
Farm average	**6**	**37**	**5**	**23**	**22**	**12**	**11**	**18**	**9**	**52**	**11**	**4**
	In.		In.		In.		In.		In.		In.	
Total rainfall	9.20		13.24		15.50		12.36		10.28		12.12	
"Useful" rainfall	8.41		5.16		13.76		8.24		8.69		8.85	

Experimental Plots.

A series of permanent experimental plots, on which the various treatments to be given are to be continued for a number of years on the same blocks of land, has been mapped out. The series consists of manurial and cultivation tests of both wheat and barley.

Manurial Plots with Wheat.

The permanent manurial plots with wheat—being worked on the following rotation:—(1) Pasture, (2) bare fallow, (3) wheat—carried their third crops this season, with the following results:—

Permanent Manurial Plots with Wheat—Veitch's Well, 1920-1922.

Plot.	Manuring per Acre.	Yield per Acre. 1920.	1921.	1922	Means, 1920-22.
		Bush. lbs	Bush. lbs.	Bush. lbs.	Bush. lbs.
1	½cwt. superphosphate	28 43	15 47	12 15	18 55
2	1cwt. superphosphate	28 19	17 53	13 6	19 46
3	2cwts. superphosphate	32 29	19 9	12 49	21 29
4	3cwts. superphosphate	31 37	19 18	12 4	21 0
5	No manure	24 59	14 33	13 13	17 35
6	1cwt. superphosphate, ½cwt. sulphate of potash	28 18	19 47	13 14	20 26
7	1cwt. superphosphate, ½cwt. nitrate of soda	26 59	17 47	12 50	19 12
8	1cwt. superphosphate, ½cwt. sulphate of potash, ½cwt. nitrate of soda	29 53	18 30	12 11	20 11
9	No manure	21 18	15 49	13 26	16 51

Cultivation Tests with Wheat.

A series of experimental plots, worked on the following rotation:—(1) Pasture, (2) bare fallow, (3) wheat, and having as its object the testing of the different methods of cultivating bare fallow for the growing of wheat, was commenced in 1920. The results secured from these plots are set out below:—

Cultivation Plots with Wheat—Veitch's Well, 1920-1922.

Plot.	Treatment	Yield per Acre. 1920.	1921.	1922.	Means, 1920-1922.
		Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.
	Early Fallow (June-July).				
10	Ploughed 4in. deep and harrowed within a few days. (Cultivated whenever weeds or a crust rendered necessary)	27 5	17 28	12 57	19 10
11	Ploughed 4in. deep and left rough throughout the winter. (Cultivated whenever weeds or a crust rendered necessary)	2? 19	17 8	13 31	19 39

Cultivation Plots with Wheat [illegible] continued.

Plot.	Treatment.	Yield per Acre. 1920. Bush. lbs.	1921 Bush. lbs.	1922. Bush. lbs.	Means. 1920-1922 Bush. lbs.
	Early Fallow (June-July).				
12	Ploughed 4in. deep, rolled within a few days, and cultivated or harrowed according to circumstances. (Cultivated or harrowed whenever weeds or a crust rendered necessary) .	27 33	13 45	12 44	18 1
	Late Fallow (September).				
13	Ploughed 2in. deep, and cultivated whenever weeds or a crust rendered necessary, but not rolled . .	24 19	14 17	12 51	17 9
14	Ploughed 4in. deep, heavily rolled the same day as ploughed, and immediately harrowed. (Cultivated whenever weeds or a crust rendered necessary) . . .	26 33	13 16	12 28	17 26

Manurial Plots with Six-rowed Barley.

On the idea that light-textured soils in low-rainfall conditions should be utilised to produce barley crops rather than wheat crops, as is the case in other low-rainfall countries, a series of manurial plots with six-rowed barley on the (1) Pasture, (2) bare fallow, (3) barley rotation has been arranged, and in these plots the same system of manuring as that adopted for the wheat manurial plots is being practised.

Manurial Plots with Six-rowed Barley—Veitch's Well, 1920-1922.

Plot.	Manuring per Acre.	Yield per Acre. 1920. Bush. lbs.	1921 Bush. lbs.	1922. Bush. lbs.	Means, 1920-1922. Bush. lbs.
28	½cwt. superphosphate . .	34 22	25 27	20 48	26 49
27	1cwt. superphosphate	28 15	28 49	22 22	26 29
26	2cwts. superphosphate .	29 47	21 33	20 13	23 48
25	3cwts. superphosphate	25 6	23 42	17 21	22 6
24	No manure	27 36	14 40	19 10	20 29
23	1cwt. superphosphate, ½cwt. sulphate of potash	26 3	21 46	20 9	22 36
22	1cwt. superphosphate, ½cwt. nitrate of soda	32 22	19 15	20 25	24 4
21	1cwt. superphosphate, ½cwt. sulphate of potash, ½cwt. nitrate of soda	25 6	19 15	20 1	21 24
20	No manure	24 10	15 39	16 39	18 46

Cultivation Tests with Six-rowed Barley.

As in the case with the manurial plots, the cultivation tests on the (1) Pasture, (2) bare fallow, (3) wheat rotation, were duplicated as to treatment with six-rowed barley as the crop, instead of the wheat.

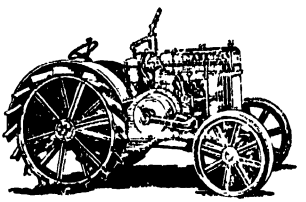
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Cultivation Plots with Six-rowed Barley—Veitch's Well, 1920-1922.

Plot.	Treatment.	Yield per Acre. 1920. Bush.	lbs.	1921. Bush.	lbs.	1922. Bush.	lbs.	Means, 1920-1922. Bush.	lbs.
	Early Fallow (June-July).								
19	Ploughed 4in. deep and harrowed within a few days. (Cultivated whenever weeds or a crust rendered necessary) .	29	10	19	34	18	39	22	28
18	Ploughed 4in. deep and left rough through the winter. (Cultivated whenever weeds or a crust rendered necessary) .	26	7	18	12	16	45	20	21
17	Ploughed 4in. deep, rolled within a few days, and cultivated or harrowed according to circumstances. (Cultivated whenever weeds or a crust rendered necessary) (late fallow, September)	30	41	23	29	17	0	23	40
16	Ploughed 2in. deep and cultivated whenever weeds or a crust rendered necessary, but not rolled	34	8	20	17	19	7	24	27
15	Ploughed 4in. deep, heavily rolled the same day as ploughed, and immediately harrowed. (Cultivated whenever weeds or a crust rendered necessary)	30	3	20	19	18	45	23	6

Rate of Seeding Tests with Wheat.

A block of land in a fallowed field has been selected during each of the past eight years, and has been divided into plots, all of which have received a dressing of 1cwt. superphosphate per acre, but each one had a different quantity of seed wheat sown on it. The same variety of wheat was used on all plots in each individual year, and other than the amount of seed used on the plots, their treatment was identical. The results obtained over this period, 1915 to 1922, are set out below:—

Quantitative Seed Tests—Veitch's Well, 1915-1922.
(*Tests on Wheat Sown with* 1*cwt. Superphosphate per Acre.*)

Year.	30lbs. Wheat. B.	L.	45lbs. Wheat. B.	L.	60lbs. Wheat. B.	L.	80lbs. Wheat. B.	L.	Total Rainfall. In.	"Useful" Rainfall. In.
1915	9	47	10	9	10	45	9	57	9.83	8.79
1916	18	9	19	1	19	5	18	39	16.69	15.29
1917 .. .	22	53	23	42	23	56	26	31	16.60	11.56
1918	7	20	8	39	8	53	8	41	9.20	8.41
1919	7	21	7	20	7	51	8	34	13.24	5.16
1920	24	56	25	49	25	12	27	29	15.50	13.76
1921	17	13	19	31	19	16	18	31	12.36	8.24
1922.	17	22	17	26	17	21	17	37	10.28	8.69
Means ..	15	38	16	27	16	32	17	0	12.96	9.99

Although the differences between the results in the mean yields are not very marked, they are sufficient to show that in this district:—

(1) 30lbs. of seed is not sufficient for the best results.

(2) The yields increase as the amount of seed wheat used is increased to 80lbs. of seed per acre.

(3) The greatest net increase of crop, over and above the crop produced from 30lbs. of seed wheat per acre, is secured by using 80lbs. of seed per acre, and this is also worth a considerable amount where a good stubble burn is required.

Rate of Seeding Tests with Barley.

This season a block of "new" land, about 18 acres in extent, was divided into six plots, the whole of which was at seeding dressed with 1cwt. superphosphate per acre, but each plot received a different amount of seed barley (Tunis 1) to the acre. The yields obtained are set out below:—

Quantitative Seed Tests—Veitch's Well, 1922.

(*Tests on Barley Sown with 1cwt. Superphosphate per Acre.*)

Year.	20lbs. Barley. Bush. lbs.	30lbs. Barley. Bush. lbs.	40lbs. Barley. Bush. lbs.	50lbs. Barley. Bush. lbs.	60lbs. Barley. Bush. lbs.	70lbs Barley. Bush. lbs.
1922 ..	4 33	5 5	6 28	8 23	8 18	6 21

Fertiliser Tests with Wheat.

As it will be some years before the results to be secured from the permanent manurial plots can be used as a basis of comparison, and as tests with various dressings of superphosphate on wheat crops have been conducted on fallow land, it will be instructive to tabulate the yields obtained over the past seven years. These are as follows:—

Quantitative Fertiliser Tests—Veitch's Well, 1915-1922.

Year.	No Manure. B.	No Manure. L.	½cwt. Super. B.	½cwt. Super. L.	1cwt. Super. B.	1cwt. Super. L.	2cwts. Super. B.	2cwts. Super. L.	3cwts. Super. B.	3cwts. Super. L.
1915	11	52	13	15	13	43	13	40	13	19
1916	13	39	17	7	18	49	18	32	21	31
1917	20	47	23	48	25	30	21	17	25	15
1918	5	17	6	20	7	28	8	22	9	9
1919	9	15	9	28	9	43	10	37	8	58
1920	23	8	28	43	28	19	32	29	31	37
1921	15	11	15	47	17	53	19	9	19	18
1922	13	20	12	15	13	6	12	49	12	4
Means	14	4	15	50	16	49	17	7	17	39

CLEFT GRAFTING.

"The best time to graft grape vines by the ordinary cleft method is when the stocks have shot out into foliage, say, when the shoots have reached 4in. to 6in. in length. If done before this, bursting of the buds takes place, the crude sap floods the sections and prevents the union of the tissues of stock and scion. It will be necessary to secure the scions at once, if not already procured. These should be buried in a cool, moist, shaded position to keep the sap inactive and the buds dormant until the stock vines in the open have leafed out as described."

After having tendered this advice to a vinegrower on one of the River Murray Settlements, the Horticultural Instructor (Mr. Geo. Quinn) recently described the procedure of cleft grafting as follows:—

When the first leaves have emerged on the stock plants, saw the trunks off at about the ground line or an inch below that. Split the stock carefully with a large knife—an old sheep shearing blade makes a good grafting tool—and if the grain does not split smoothly and straight start the cleft by sawing about an inch or inch and a half down. When the cleft is made, clean the edges of the bark and sapwood with a knife if they are frayed out. Then insert a wedge in the centre to hold open the cleft. If the stock is a couple of inches or more in diameter insert a scion on each side. Cut the scions wedge shaped and tapering on the inner edges, so as not to hold the split open towards the centre of the stock any more than necessary. Make the chisel or wedge end on an internode and about 3in. long, allowing one bud to remain at the top of the wedge section facing outwards, and another on the top extremity of the scion—two buds in all on each scion. Fit the wedge shaped ends into the cleft on each side, seeing that the inner barks of scion and stock meet as much as possible, then carefully withdraw the distending tool from the cleft of the stock, which should come together and clasp the scions firmly into position. A piece of binder twine is bound around the split stock as a safeguard and finally the whole lot, scions included, is covered up by a mound of fine soil, say, to a depth of a couple of inches or more. It is a good plan before mounding up to insert a stake alongside the stock as a protection or indicator of its position. When growth begins it is often suckers from stocks which push through the mound first. When the first shoots show freely the mound should be explored promptly, but with reasonable care, and should the shoots prove to be suckers they must be suppressed and the mound replaced. The buds on the scion often lag, but start some weeks later; whilst they hold life there is always hope of growth ensuing. If both scions grow, one may be removed at the next winter's pruning, the best one being carried straight on to the trellis and formed as if it were a young vine. The other may be allowed to grow through the first summer anyhow, and is retained for physiological reasons bound up in the well-being of the root system.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

CONFERENCE OF SOUTHERN BRANCHES.

The annual conference of Southern Branches of the Agricultural Bureau was held at Strathalbyn on Tuesday, August 14th. The Department of Agriculture was represented by Capt. S. A. White, C.M.B.O.U. (Vice-Chairman of the Advisory Board of Agriculture), the Superintendent of Experimental Work (Mr. W. J. Spafford), the Government Dairy Expert (Mr. P. H. Suter), the Government Poultry Expert (Mr. D. F. Laurie), the Secretary of the Advisory Board of Agriculture (Mr. H. J. Finnis), and the Field Officer (Mr. S. B. Opie). There was an excellent attendance of delegates from the following Branches:—Strathalbyn, Port Elliot, Rapid Bay, Milang, Rockwood, Blackheath, Ashbourne, Currency Creek, and Hartley. The chairman of the local Branch of the Bureau (Mr. J. Saunders), in the course of a short address, extended a cordial welcome to the officers of the Department and visiting delegates, and called on Capt White to open the conference. The chairman's remarks were supported by the Mayor of Strathalbyn (Mr. J. W. Elliott). Capt. S. A. White, C.M.B.O.U. (Vice-Chairman of the Advisory Board of Agriculture), first apologised for the absence of the Hon. the Minister of Agriculture (Hon. G. F. Jenkins, M.P.), and said how pleased he was to have the honor and the privilege of opening a conference of primary producers who were, without doubt, the backbone of the State. He hoped that the producers would have a profitable and enjoyable conference, and would leave the hall at the conclusion of the gathering feeling that they had learned something that would be of use to them in the pursuance of their daily occupations. He then declared the conference open. Mr. H. Hamblyn, a delegate from the Rapid Bay Branch, read a paper, "Fat Lamb Raising," in the course of which he expressed the opinion that the southern areas of the State were eminently suited for the raising of fat lambs for the local and overseas markets. Many farmers were of the opinion that they could grow top-priced wool and fat lambs at one and the same time. That was a mistake. If fat lambs were the object in view, the wool should only be regarded as a secondary item. If producers could put good, prime, six months' old lambs weighing 50lbs. on the market they would find a ready sale for them. One of the main factors to ensure success was that the farmer should study local conditions and so arrange for the "drop" to take place that the life of the lamb would include the best five or six months of the year. The farmer should not worry about the fluctuations of the market, but devote more attention to the maturity of the lamb. For the southern districts he favored a long woolled crossbred ewe, mated with a Shropshire ram. The lambs should be dropped in May and not later than June. Tailing should be performed with the searing iron when the lambs were from three to four months old. On a farm on which fodders were grown for fat lamb raising, the first feed for the ewe and lamb would in all probability be an early sown crop of barley, followed by oats,

then rape or lucerne, ... visio of fodder the farmer should not fail to realise the importance of a change of feed for the stock. If possible, the ewes and lambs should be given a change of pasture each day. Ample provision should also be made for a good supply of water. If the fodder crops yielded very heavy returns, particularly with rape or lucerne, the paddocks should be divided with hurdles in order to minimise waste that might be caused by the sheep grazing over the fields. An interesting discussion followed, in which Messrs. J. Brown (Port Elliot), C. W. Ness (Rapid Bay), the Government Dairy Expert (Mr. P. H. Suter), Mr. H. B. Welch (Port Elliot), the Superintendent of Experimental Work (Mr. W. J. Spafford), Mr. W. H. Cuming, and Mr. J. Saunders (Strathalbyn) took part. This was followed by a paper, "Hedges around Homestead, Orchard, and Pleasure Grounds," by Mr. W. E. Hargreaves (Port Elliot Branch). After the luncheon adjournment Mr. E. Bottrill (Strathalbyn) moved and Mr. T. Collett (Strathalbyn) seconded, "That the Advisory Board be asked to approach the Railways Commissioner with a request that a moveable partition be provided in the trucks used for the carriage of pigs and calves together." The motion was supported by Capt. S. A. White, Mr. S. Collett (Rockwood), the Government Dairy Expert (Mr. P. H. Suter), and Mr. W. E. Hargreaves (Port Elliot). A paper dealing with the subject, "Destruction of Rabbits," was contributed by Mr. R. Walsh (Rapid Bay). Mr. Walsh expressed the view that rabbits could be kept under reasonable control if proper methods were adopted, but for any measure to be successful it was necessary for the farmers to co-operate in their efforts. The poison cart should be used after a fall of rain. When the baits were being prepared, bran should be mixed with the pollard so that they would not become hard. After a paddock had been treated with the poison cart, ferrets and traps should be brought into use. Finally, all the holes should be filled in. Large warrens, the speaker thought, should be dug out during hot weather, and if that were done a few times the rabbits would soon leave them. All places likely to provide harbors for rabbits should be removed, the farmers keeping in mind the fact that only by persistent and co-operative efforts would they keep the pest under control. The discussion which followed indicated that the majority of members were of the opinion that one of the best means of dealing with the rabbits was to use the fumigator and other methods of killing the rabbits in the burrows. Mr. H. Warner, a delegate from the Milang Branch, then read a paper, "Crop Rotation," which provoked a keen and interesting discussion. Mr. J. Brown (Port Elliot) gave a short address in which he dealt with the irrigating and drainage of land. The evening session was opened with a "Free Parliament," in the course of which it was decided on the motion of Mr. C. W. Ness (Rapid Bay), seconded by Mr. G. G. Cant (Rapid Bay), "That Branches of the Agricultural Bureau represented at this conference should approach their respective district councils with the object of bringing about the establishment of a District Councils Vermin Board, and the appointment of an officer or officers to supervise the destruction of vermin in their districts." Mr. W. H. Cuming (Strathalbyn) then moved

[illegible] that the Stock and
the provisions of the Stock Diseases Act. Mr. S. Collett (Rockwood) seconded. Mr. G. W. Montgomery (Strathalbyn) then moved and Mr. J. McCheriton (Strathalbyn) [illegible] that the Noxious Weeds Destruction Act be amended." The resolution was carried. On the motion of Mr. E. R. Heath (Rockwood), seconded by Mr. S. Collett (Rockwood), it was resolved "That this conference recommends the Government to conserve the waters of the Finniss and Angas Rivers for the purpose of irrigating the plains of Strathalbyn and the surrounding districts." Dr. Formby seconded the resolution, which was carried. The Blackheath Branch submitted the following questions:—(1) At what time of the year is it best to lay poison for foxes? (2) Over how long a period should it extend? And (3) What is the best bait and how can it be laid to ensure the best results? Mr. W. H. Cuming (Strathalbyn) thought poisoning should be started in February and continued during March and April. He cited a case where 80 foxes had been destroyed with baits prepared of bread and butter. Poisoning, he thought, should be continued throughout the whole of the year. Mr. C. W. Ness (Rapid Bay) thought the baits should be set out before lambing and just after the first rains. Birds treated with strychnine had given him the best results. Mr. H. M. Hassam (Milang) asked "What is the difference between agricultural lime and burnt lime, and what are the benefits to be derived from their use?" The Superintendent of Experimental Work (Mr. W. J. Spafford) said the Fertilisers Act described agricultural lime as finely ground limestone, shells, or marble. Burnt lime was actually the burnt limestone. The main work that lime did in the soil was to correct bad mechanical conditions, to correct excessive acidity, liberate plant food, and encourage bacteria. The addition of lime to clayey and sticky soils was the only way quickly to overcome that condition. Liming the soil was an expensive undertaking, and the speaker was doubtful whether it was worth while to apply it where farmers only intended growing such as cereal crops. In reply to further questions Mr. Spafford said an application of lime to the soil would not assist in the killing of the plant known as "pig face." Regarding the action of lime on sorrell he said that, whilst lime did not actually kill the sorrell, it had the effect of encouraging the growth of the desirable plants and crops to such an extent that they checked the development of the sorrell. On the motion of Mr. W. H. Cuming (Strathalbyn), seconded by Mr. F. W. Allison (Strathalbyn), it was decided that the 1924 conference should be held at Port Elliot. The Mayor (Mr. J. Elliott), on behalf of the town of Strathalbyn, thanked the officials for the useful budget of information they had conveyed to the producers of the district during the various sessions of the conference. Mr. S. Collett (Rockwood) seconded a vote of thanks, which was carried with acclamation. The Secretary of the Advisory Board (Mr. H. J. Finnis), on behalf of the Departmental Officers, responded, and was supported by the Field Officer (Mr. S. B. Opie). Mr. H. Welch (Port Elliott) proposed, and Mr. W. E. Hargreaves seconded, a vote of thanks tc the Chairman (Mr. Saunders) and the Hon. Secretary (Mr. F. W. Allison) of the local Branch for the excellent way in which they had conducted the conference.

AGRICULTURAL BUREAU CONFERENCE AT LAMEROO.

At Lameroo, on Tuesday, August 28th, delegates representing the Claypan Bore, Parilla Well, Geranium, Clanfield, Parilla, Pinnaroo, and Lameroo Branches of the Agricultural Bureau met in Conference. The chairman of the local Branch (Mr. P. J. James) presided over the gathering, and had with him on the platform, the Director of Agriculture (Pro. A. J. Perkins), the Horticultural Instructor (Mr. Geo. Quinn), Field Officer (Mr. S. B. Opie), and the Secretary, Advisory Board of Agriculture (Mr. H. J. Finnis), representing the Department of Agriculture. In the absence of the Minister of Agriculture (Hon G. F. Jenkins, M.P.), the Director of Agriculture (Professor Arthur J. Perkins) delivered the opening address. After having congratulated the district on the satisfactory character of the season from their point of view, he referred to the somewhat problematical question of the price of wheat for the immediate future, an aspect of agricultural affairs which was worrying most farmers. They could not expect the the highly remunerative prices which had prevailed of recent years, to continue indefinitely, he said, but wheat sometimes showed a tendency to fall below the average cost of production. The prospect at the present time was disquieting, and there was nothing to which they could turn with greater prospect of improving the position than a careful examination of the expenditure involved in production, with a view to reducing it to a minimum. This involved keeping careful notes of all expenditure and receipts and analysing these data at the end of the year. This was actually being done at the present time at the Government Demonstration Farm at Turretfield, and he was hopeful of being able to undertake a similar examination of accounts of several privately owned farms in different portions of the State, with a view of working out and analysing the results. As a means of increasing the revenue of their holdings, they would probably find when their farms were securely fenced, properly subdivided, and generally improved, that they would be able to turn to keeping sheep. He had much pleasure in declaring the Conference open, and expressed the hope that their deliberations would help in the general working of their farms.

Papers.

The papers read at the Conference included "Farm Management and Efficiency," by Mr. P. H. Jones (Pinnaroo Branch); "Utility Poultry," by Mr. W. Krierwaldt (Lameroo Branch); "The Manufacture of Woollen Goods in Australia," by Mr. R. L. McKenzie (Pinnaroo Branch); and "A Method of Account and Record Keeping for Farmers," by Mr. A. L. Orwell (Clanfield Branch). Each of these papers was in turn supplemented by criticism.

Resolutions.

At the instance of Mr. R. L. McKenzie (Pinnaroo Branch), seconded by Mr. H. C. Fewings (Pinnaroo Branch), it was resolved "That the Advisory Board be asked to request the Government to offer a bonus

for the eradication of take-all," and on the motion of Mr. L. Orwell (Lameroo Branch), seconded by Mr. W. Krierwaldt (Lameroo Branch), it was resolved "That this Conference desires the formation of a Circulating Library of Agricultural Literature for the Branches of the Agricultural Bureau." It was further resolved that the 1924 Conference should be held at Pinnaroo, the local arrangements being undertaken by the Parilla Well Branch.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, August 8th, there being present Captain S. A. White (Vice-Chairman), Colonel J. Rowell, Messrs. C. J. Tuckwell, F. Coleman, A. M. Dawkins, H. Wicks, and the Secretary (Mr. H. J. Finnis). Apologies were received from Professor Arthur J. Perkins, and Messrs. W. J. Colebatch, T. H. Williams, and W. J. Sandford.

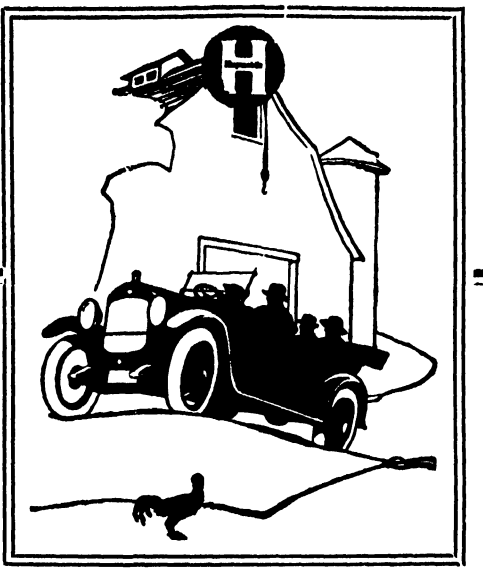
Woolly Aphis Parasite.—The Horticultural Instructor (Mr. G. Quinn), in reporting on a resolution received from the Cherry Gardens Branch of the Agricultural Bureau suggesting that the woolly aphis parasite (*Aphelinus mali*) should be introduced into the State and distributed amongst infested orchards, said he was expecting to receive in the course of a few days a supply of the insects through the Government Entomologist from the Cawthron Trust Institute of New Zealand. The Secretary was instructed to advise the Branch accordingly.

Wheat Prices.—Arising out of a resolution, which was carried at the Conference of Lower Northern Branches of the Agricultural Bureau, "that the Advisory Board should be asked to ascertain the reason for the difference in the quoted prices of wheat in South Australia and those of other States," the Secretary of the Board was instructed to communicate with the Chambers of Commerce in Victoria and New South Wales. A reply was received from the Corn Sectional Committee of the Victorian Chamber of Commerce as follows:—"I beg to acknowledge receipt of your letter of 13th ult., which was referred to the Corn Trade Sectional Committee of this Chamber for report. I am directed by the Chairman of the Section to advise you that in the opinion of members of the Committee the Sydney and Melbourne quotations are more or less fictitious for more than one reason. In the first place, owing to the policy of the pools in Victoria and New South Wales in quoting a local price to millers and giving a varying rebate to them for export purposes, the prices in Melbourne and Sydney have been very difficult for the press to arrive at. It should also be borne in mind that the rebate allowed by the Victorian Pool to millers is not published, nor are the sales made by the pool of wheat overseas (which have taken place considerably

under the value appearing in the press), made public. I would also like to point out that Victoria has no railway shunt or wharfage, which would make a difference of 1¼d. per bushel as against South Australia. Furthermore, South Australia has been competing at the world's parity, and this would account for the fact that the South Australian Pool stocks are very low, all the wheat which is being held in South Australia belonging to farmers who have stored it with the trade. The Victorian and New South Wales farmers still have a great deal on hand. As a further illustration, I might mention that free wheat was offering in Sydney a few days ago at 4s. 9d. without finding buyers, whereas the pool price is nominally stated to be 5s. for bagged wheat."

From the Sydney Chamber of Commerce, Incorporated:—"In reply to your favor of the 13th instant, I can, to some extent, understand that farmers in your State may find it difficult to reconcile the difference in the price of wheat quoted in the press in various States. I believe the custom here is for the commercial editors to send their representatives round amongst millers, dealers, shippers, &c., with a view to securing information from day to day as to the course of the local market, and, on the information so obtained, base their quotations from day to day, or from week to week, as the case may be. The position here has until quite recently been different to that in the other States owing to the droughty conditions which existed over the greater portion of the State, and induced the New South Wales Voluntary Pool authorities to hold the wheat in the pool against a possible crop failure by asking the prices certainly unwarranted by the saleable return which could be obtained for cargoes shipped to European destinations. That position has now been relieved by the recent rains over practically the whole of the wheat-growing country, although more moisture is still needed over the northern areas. The pool has now been chartering some tonnage and effecting parcel shipments as well, and, according to press returns, are now going to ship some 200,000 tons of wheat which had been held in reserve. Practically the whole of the bulk wheat has been controlled by the Wheat Pool, but as regards the bagged wheat, the position has been somewhat different, and many owners thereof have sold direct to shippers and millers at figures which permitted either shipment of wheat to oversea destinations, or enabled millers to make flour at competition prices. It is, however, well known that millers have been seriously handicapped in their export business by the impossibility of securing wheat on basis of world parity to enable them to make flour, which could be sold in competition with the millers of other countries, and indeed, other States of the Commonwealth. Quite a considerable quantity of flour orders, which came here during recent months, have been executed by millers at other ports."

Carriage of Stock on Railways.—The recent Conference of Upper Northern Branches resolved—(*a*) "That the Advisory Board be asked to approach the Railways Commissioner with reference to the delay in the carriage of stock on railways." It was decided to transmit the matter to the Railways Commissioner. (*b*) "Transmission of cancer



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from animals to human beings." The same Conference also resolved "That the Stock Department be asked to supply a report on the possibility of the transmission of cancer from animals to human beings." The Secretary was instructed to ask the Stock Department to furnish a report on the mater.

Standard Fruit Case.—A resolution was received from the Blackwood Branch dealing with the branding of fruit cases. The Secretary was instructed to forward the resolution to the Minister for his information.

Upper Sturt Water Scheme.—The Blackwood Branch also submitted a resolution relating to the proposed Upper Sturt water scheme. The resolution was received.

Bird Pest.—The following resolution was received from the Cherry Gardens Branch:—"That the Advisory Board be asked to approach the Hon. the Minister of Agriculture to ascertain if the Government can in any way assist the orchardist in combating the bird pest, principally the parrot and the starling."

The late Mr. R. Marshall.—On the motion of Colonel Rowell, seconded by Mr. A. M. Dawkins, the Secretary was instructed to send a letter of condolence to the family of the late Mr. Richard Marshall.

New Branches.—Approval was given for the formation of new Branches at Cobdogla, Mannanarie, and Light's Pass, with the following gentlemen as foundation members:—Cobdogla—Messrs. R. H. Shueard, A. J. Atkinson, J. McBride, W. Young, A. G. Ireland, A. Bonshear, E. C. Wegener, E. G. and R. Poyner, R. Semmens, L. W. Clements, G H. Kokegai, C. M. Almond, T. J. English, R. and J. Mudge, J. R. McGurie, H. T. Coats, J. W. Proud, A. E. Spencer, H. Schneider, W. H. Sutton, R. James. Mannanarie—Messrs. J. M. Harvie, J. H. Cundy, G. S. Young, P. J. O'Loughlin, R. von Bertouch, E. D. Bowman, W. Pile, L. E. Travers, O. Clark, T. W. Chesson, N. A. Lawson, J., A. T., and A. Symons, H. E. and J. M. Robinson, W. Oake, W. Crawford, A. L. Jones, L. F. Gerke, A. A. Cadjow, A. Bailey, W. D. and R. McK. Campbell, J. H. Thomas. Light's Pass—Messrs. S. and L. Plush, B., F. W., and B. Boehm, T. and B. Gerlach, R. F. Jacob, L. Cope, S. Ellis, E. Polst, P. Sporn, P. Spanagel, E. A. and A. Mader, C. A. Verrall, J. J. Stolz, B. Scholz, A. Pfeiffer, H. Fuller.

New Members.—The following names were added to the rolls of existing Branches:—Goode—E. M. Morcombe, L. Dacre, W. Dacre; Blackheath—B. Strauss; Balhannah—G. R. Cowell; Shoal Bay—Chas. Hall; Redhill—C. R. Coleman; Moonta—R. Retallick, C. Cook; Pinnaroo—A. Bennett; Beetaloo Valley—J. Venebubles; Rosedale—S. Gursanske; Lameroo—J. Harder; Wanbi—W. S. Delamere, H. Ridgley; Blackwood—S. Opie; Willowie—S. H. Moundford, C. L. Schmidt; Lone Gum and Monash—H. Rayner; Rapid Bay—S. J. Ford; Parilla—E. D. Elain, A. W. Threadgold, C. Neindorf, K. Goldsworthy; Crystal Brook—H. C. Williams; McLachlan—H. Whittle, L. Pearce, J. E. Buzacott; Williamstown (Women's)—Mrs. A. E. Williams, Mrs. W. Wilkin, Miss D. Wilkin; Talia—A. Cameron; Ren-

mark—O. Weste; Cherry Gardens—W. H. King; Hartley—D. G. Taylor, A. V. Lehmann; Rendelsham—C. Fairhmann, C. W. Chambers, M. Galwey; Tarlee—J. Dee; Colton—F. W. Usher, C. G. Olson; Millicent—W. H. Hateley, J. W. Williams, J. H. Daniel; Morehard—C. Longbottom, A. Saunders; Aldinga—B. Lovelock, H. Ellbourn; Marama—T. W. Wheatley; Maltee—E. L. Winton, H. Tuestner, A. J. Marchant; Geranium—J. Bowden, E Rogers; Williamstown—H. C. Chalk, R. Wilson; Allandale East—F. Tooth, Thos. Earl, jun., M. McCabe, T. E. Lock; Wilkawatt—K. Bowman; Kybybolite—M. Glynn; Balhannah—Rev. R. V. S. Adams, H. F. Rose, B. Cullen, A. Adams, C. O. Smith; Kongorong—C. Dixon, W. A. Butler, D. McNicol, E. Johns; Nelshaby—W. Gordon, V. Sellick, P. Noble; Kilkerran—E. H. Dutschke, B. J. Gregory; Whyte-Yarcowie—F. J. McCallum; Hookina—R. Wardleworth; Block E.—H. Smith; Winkie—C. McDonald; Murray Bridge—E. Newmann, J. Anderson; Monarto South—E. Tilbrook; Lake Wangary—R. Puckridge, R. Hull; Nantawarra—G. M. Herbert; Collie—B. Cummins, J. Pettick; Cungena—J. Lee, H. J. Bennie, W. W. Gerswortz, G. B. Gerswortz, G. Johansen, J. Ettridge; Edillilie—M. T. Morgan, D. S. Morgan, C. F. Harder; Moorook—W. Botting, J. Swansbury, H. Gray; Penola—Rev. J. M. Taylor, Rev. R. Woodger, V. Pounsett, H. F. Alder; Millicent—E J. Mitchell, C. J. Hutchesson; Pinnaroo—J. E. Symons; Saddleworth—F. T. T. Smith.

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RESULTS OF BUTTERFAT TESTS FOR JULY, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during July.	Per Cow during July.	Per Cow October to July.	Per Herd during July.	Per Cow during July.	Per Cow October to July.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1/C	30·13	21·39	21247·5	705·19	7326·51	809·08	26·85	293·51
1/E	23	22·16	11637·5	705·98	5663·16	535·66	23·29	250·37
1/J	20·84	19·61	10708·5	513·84	5171·60	491·40	23·58	236·76
1/L	16·84	13·35	9238	548·57	5546·18	439·42	26·09	255·93
1/M	23	18·16	9016·5	392·02	4995·92	466·85	20·30	249·55
1/R	16·33	12·23	7381	451·99	4862·47	384·39	23·54	245·59
1/T	12·06	10·42	5941	492·62	5266·19	299·19	24·81	264 89
1/U	16·13	15·06	11210·5	695·01	6514·05	490·53	30·41	281·22
1/W	20·39	18·84	11002·5	539·60	6111·89	430·29	21·10	231·37
1/X	18·23	13·23	8600	471·75	5392·79	358·67	19·67	241·38
1/Y	24·68	18·84	14513	588·05	6171·86	569·60	23·08	264·63
1/Z	20	15·26	10322·5	516·13	5036·94	445·71	22·29	226·61
*1/AA	7	6·90	3655·5	522·21	6182 50	192·38	27·48	274·87
*1/BB	8	7	3534	441·75	4912·20	163·74	20·47	216·13
†1/Cc	16·67	15·45	10549·5	632·84	3548·99	461·72	27·70	153·04
‡1/V	14 06	14·06	7398	526·17	3520·35	341·13	24 26	156·74
Means	17·96	15·12	9747·22	542·72	5788·89	429·99	23·94	255·54

* Entered Association November 1st, 1922. † Entered Association December 1st, 1922.
‡ Entered Association Februray 1st, 1923.

COWS YIELDING 1,000GALLS. OF MILK OR 400LBS. OF BUTTERFAT DURING A LACTATION PERIOD.

Name of Cow.	Owner.	No. of Days.	Milk.	Butterfat.
			Gallons.	Lbs.
Rainbow	C. J. Morris, Monteith	308	1123·75	427·53
Tracey	C. J. Morris, Monteith	304	1055·00	415·23

MT. GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JULY, 1923.

Herd No.	Average No of Cows in Herd	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during July.	Per Cow during May.	Per Cow August to July.	Per Herd during July.	Per Cow during July.	Per Cow August to July.
			Lbs.	Lbs	Lbs.	Lbs.	Lbs.	Lbs.
2/A	20	7 35	2804·5	140·23	4818 89	104·85	5·24	207·05
2/B	6·87	4·65	3511	511·06	8635 13	144·88	21·09	360·32
2/C	18·94	16·71	8522·5	449·97	6406·00	289·73	15·30	255·45
2/D	13	8·55	2529·5	194·58	4726·63	98 35	7·57	188·71
2/E	11	8·10	3173·5	288 50	6461 27	125·97	11·45	285·25
2/F	20	14·81	6945·5	347·28	5570 82	343 03	17·15	229·90
2/G	1	1	1240	1240	8751·24	52·58	52·58	395·01
2/H	24	13·77	9161·5	381·73	5322 03	349 78	14·57	222·05
2/I	12	5·61	2993·5	249·46	5519 99	121·16	10·10	227·76
2/J	11	5·19	2752·5	250·23	7398·33	123·98	11·27	318·55
2/K	21	13·74	3706	176·48	6117 75	160 58	7·65	261·34
2/L	30·03	16·29	5240·5	174·51	4554·44	215·22	7·17	207·68
2/N	12	Nil	Nil	Nil	3719 85	Nil	Nil	150·90
2/O	37·42	23 29	11908	318·23	4204 28	427·71	11·43	170·80
2/Q	33	9 84	5198·5	157·53	4536 02	200 27	6·07	185·91
2/R	16·90	11 29	8373	495 44	8792 65	361·20	21·37	385·81
Means	18 01	10 01	4878·75	270·89	5515 60	194 95	10 82	231 86

COWS YIELDING 1,000GALLS. OF MILK OR 400LBS. OF BUTTERFAT DURING A LACTATION PERIOD.

Name of Cow.	Owner.	No. of Days.	Milk.	Butterfat.
			Gallons.	Lbs.
Horney	E. W. Tollner, Mt. Gambier.....	319	1110·35	441·51
Snck	E. W. Tollner, Mt. Gambier.....	319	954·55	402·54
Nobby	E. W. Tollner, Mt. Gambier.....	319	789·70	418 09

DAIRY AND FARM PRODUCE MARKETS.

A W. Sandford & Co., Limited, reported on September 1st, 1923:—

BUTTER.—During the month supplies of dairy products have increased considerably, but the wintry conditions have made the season later than usual, and whereas during August last year big quantities of butter were being shipped overseas, it was only at the close of last month that shipments were being made to London. Since our last report values of top grades have come back, but towards the latter end of the month there has been a slight firming in rates. Choicest factory and creamery fresh butter in bulk, 1s. 4¼d.; second grades, 1s. 2½d. to 1s. 3d.; best separators and dairies, 1s. 3d. to 1s. 4d.; fair quality, 1s. 2½d to 1s 2¾d.; store and collectors, 1s. to 1s. 2d.

EGGS —The seasonable increase for this time of year was interfered with by the cold weather, and, although the price came back, a reaction set in, and the market closed firm at 1s. per dozen for fresh hen; duck, 1s. 1d.; with local and interstate buyers operating freely.

CHEESE.—Fair-sized consignments arrived weekly from the South-Eastern factories, with prices recording minor alterations. At the moment local and interstate buyers are readily clearing all available, the range being from 1s. 1d. to 1s. 2½d. for large to loaf.

HONEY.—At the beginning of the month interstate buyers were purchasing on this market for their requirements of all grades, but towards the close fairly large stocks were held, and difficulty was experienced in effecting sales, the result being that values eased. Prime clear extracted, in liquid condition, 3¾d. to 4d.; best candied lots, 3½d.; lower grades still neglected at down to 2d. per lb. Beeswax readily saleable at 1s. 3½d. to 1s. 4d. for best samples.

ALMONDS.—Fairly large parcels continue to arrive weekly, and are meeting with ready sales. Brandis, 9d. to 9½d.; mixed softshells, 8d. to 8½d.; hardshells, 4¼d. to 4½d.; kernels, 1s. 3½d. to 1s. 4d.; walnuts, 1s.

BACON.—Curers had difficulty in securing their supplies of the live hog both here and in the eastern States, which brought about a firming in the market. However, the higher prices did not affect sales, for good business has been transacted in this line during the month. Best factory-cured sides, 1s. 2d.; hams, 1s. 5½d. to 1s. 6d.; middles, 1s. 4½d.; rolls, 1s. 2d. Hutton's "Pineapple" brand lard, in packets, 1s. 2d.; in bulk, 1s. 1d. This line is very scarce.

LIVE POULTRY.—Numerous buyers exhausted their stocks of all classes of birds, and in spite of our submitting fairly extensive catalogues the supplies were short of requirements, with the result that we secured most satisfactory values for our consignors. It is anticipated that these high values will rule for some time to come, and we advise farmers to forward their surplus birds. Values at the close of the month being:—Prime roosters, 5s. to 7s. 6d. each; nice-condition cockerels, 3s. 6d. to 4s. 9d.; poor-condition cockerels, 2s. 9d. to 3s. 3d.; plump hens, 4s. to 5s. 6d.; medium hens, 3s. to 3s. 9d.; some pens of weedy sorts lower; geese, 6s. to 7s.; ducks, good condition, 5s. to 7s. 10d.; fair condition, 3s. 6d. to 4s. 9d.; turkeys, good to prime condition, 1s, 1d. to 1s. 6d. per lb. live weight; fair condition, 10d. to 1s. 0½d. per lb.; fattening sorts, lower; pigeons, 10½d. each.

POTATOES.—During the latter part of the month market has been steady, Victorian potatoes selling at from 16s. to 17s. per cwt. on trucks Mile End; parcels a shade lower.

ONIONS.—Best Mount Gambier dry onions selling at 7s. 6d. per cwt. on trucks.

MAKE SURE of POULTRY PROFITS NEXT WINTER.



Most Poultry Keepers are getting a satisfactory supply of eggs now, but on the number of eggs which their hens lay NEXT WINTER depends the profit which the season will show.

To have a good supply of eggs for sale when prices are high is the only way to make certain of profits, and the surest, cheapest, safest way to have that good supply is to use

'Karswood' Poultry Spice

(Containing Ground Insects)

Which costs only a ha'penny a day for every 12 fowls. Here is a letter typical of many we receive from users. Read it and resolve to start 'KARSWOOD' feeding now, in preparation for the moult and Winter period.

WONDERFUL RESULTS.

"9, Austral Terrace, Malvern, S.A.,
20/8/21.

Dear Sirs—I would like to inform you of the results I have obtained from using 'KARSWOOD' Poultry Spice. I was first informed of this spice by a friend of mine, who strongly advised me to use it during the moulting period. I was somewhat dubious at first in using it, as I was not a believer in spice for fowls, but after seriously considering it on account of the scarcity of eggs, I tried a packet, and am glad to state that I have had wonderful results from it. After using it for a fortnight you could see a wonderful improvement in the condition and the plumage of the birds, it having considerably assisted them through the moult, and actually started them laying in the middle of it. After using several packets of 'KARSWOOD,' and when my fowls were laying heavily, I decided to leave off 'KARSWOOD,' but after a few weeks my eggs decreased 50%. I again decided to test the qualities of 'KARSWOOD,' and glad to say that after a few days' use my fowls were again laying heavily. I am writing this to you as I feel that you have given to the poultry keeper a chance in obtaining good results from their fowls, and to 'KARSWOOD' must be given the credit of reducing the usual shortage of eggs, as you well know not prevalent this winter. You may use this letter in any way you think fit, and again thanking you

I am, yours faithfully,
(Signed) WALLIE R. ROBINSON."

Start feeding 'KARSWOOD' now and you insure your winter profits in just the same manner that 500,000 other Poultry Keepers do. It costs only a ha'penny a day for every dozen fowls, yet the results are sure and good.

NOTE THE ECONOMY.

One tablespoonful (½oz.) of 'KARSWOOD' Poultry Spice (containing ground insects) is sufficient for 20 hens for one day. So that it costs you less than a ½d. a day for every 12 birds.

1s. packet (½lb.) supplies 20 hens 16 days.
2s. packet (1lb.) supplies 20 hens 32 days.
13s. tin (7lbs.) supplies 140 hens 32 days.
14lbs. tins, 25s. 28lbs. tins, 48s.

Makes 12 Hens Lay for ½d. a Day.

MAKE A TEST.

Get a 1s. packet of 'KARSWOOD' Poultry Spice from your local storekeeper, grocer, or produce dealer—try it for a fortnight on half a dozen hens Do not expect immediate results. 'KARSWOOD' works naturally, it does not force. It takes a fortnight or three weeks to show results, but they are good and sure. If your local dealer cannot supply you, drop a postcard either to the agents for your State (address below) or to 'KARSWOOD,' Box 2138, G.P.O., Sydney, and you will be put in touch with your nearest supplier.

AGENTS FOR SOUTH AUSTRALIA—

S. C. EYLES & Co.,

CURRIE ST. ADELAIDE.

NOTE.—If supplied by Wholesale Agents direct, postage must be added to cost.

THE AGRICULTURAL OUTLOOK.

REPORTS FOR THE MONTH OF AUGUST.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective managers:—

Booborowie.—Weather—The weather during August has been ideal. The rain kept off sufficiently to enable farmers to make progress with their fallowing operations, and mild weather has caused rapid plant growth for this particular locality. Up to the time of writing 198 points of rain have been registered. Crops—The crops are now making rapid growth, and with a favorable spring some heavy yields should be obtained. Natural feed is now making good progress. Stock—All in good condition and healthy. Pests—No pests worth mentioning just at present. Miscellaneous—Farmers are very busy with their fallowing, which has been greatly delayed owing to the excessive wetness of the ground.

Kybybolite.—Weather continued wet until the middle of the month, but since then milder conditions have prevailed; 2½in. were recorded for the month. The total for the year is now over 16½in., which is 1½in. above the average for the period for past 18 years. Approximiately 16in. have fallen since May 5th. Crops are all backward, and a fair proportion have been drowned out and water grass has overcome them. Areas having good drainage and fair amount of organic matter are looking nice and healthy. Small areas are being ploughed late this month and sown to barley and peas, with the hope that the spring will favor their development. Preparations for summer crops and fallows are in hand. Natural feed has improved considerably during the latter half of the month. Stock are in very fair condition, but the lack of plenty of green feed prevents the dairy cows from producing really good returns.

Turretfield.—Weather—The beginning of the month was wet, but the weather on the whole has been seasonable; 237 points of rain have been registered. Crops are making very little improvement, even where they came up well. Large yellow patches of unhealthy plants are to be seen. Natural feed is not very plentiful, but should come along shortly. Stock—In fair condition. All large stock still require hand feeding. Miscellaneous—Fallowing is very late and is now being pushed on with.

Veitch.—Weather—We have had 159 points of rain to date for August—Veitch average for same month, 149 points. Conditions generally have been ideal for forcing on growth both in crops and feed. We required more frosts earlier in the month. Crops are all making good headway, and in some cases very rank growth is showing, but throughout the district crops are looking exceptionally well. Natural Feed—Good stock feed is now available in fields left to grass. Stock are all in healthy condition. Pests—Rabbits are the only pest giving any trouble. Miscellaneous—A large area of new ground is being rolled this year, especially west of the railway line.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., JULY, 1923.

IMPORTS.

Interstate.

Apples (bushels)	9,266
Bananas (bushels)	9,021
Custard apples (bushels)	2
Oranges (bushels)	2
Passion fruit (bushels)	299
Pears (bushels)	4
Pineapples (bushels)	887
Tomatoes (bushels)	12
Peanuts (bushels)	2
Carrots (bags)	40
Onions (bags)	1,031
Potatoes (bags)	29,473
Swedes (bags)	51
Plants (packages)	41
Trees (packages)	23
Bulbs (packages)	3
Seeds (packages)	57
Wine casks, empty (number)	2,003

Fumigated—21 packages trees, 8 packages plants, 1 bushel oranges, 2 wine casks.

Rejected—2bush. custard apples, 2bush. tomatoes, 63 bags potatoes, and 27 second-hand cases.

Overseas.

Federal Quarantine Act.

One thousand one hundred and five packages seeds, &c.

EXPORTS.

Federal Commerce Act.

Six thousand seven hundred and ninety-two packages citrus fruit, 15,504 packages dried fruit, and 1 package plants were exported to overseas markets. These were consigned as follows:—

London.

Dried fruit (packages)	9,585
Citrus fruit (packages)	3,470

India and East.

Dried fruit (packages)	118
Citrus fruit (packages)	1

South Africa.

Dried fruit (packages)	2,356

New Zealand.

Dried fruit (packages)	945
Citrus fruit (packages)	3,321
Plants (packages)	1

Canada (Vancouver).

Dried fruit (packages)	2,500

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month of and to the end of August, 1923, also the average precipitation to the end of August, and the average annual rainfall.

Station.	For Aug., 1923.	To end Aug., 1923	Av'ge. to end Aug	Av'ge. Annual Raintall
Far North and Upper North.				
Oodnadatta	—	1·92	3·58	4·93
Marree	—	3 50	4 03	6·14
Farina	0·11	5·15	4·63	6·73
Copley	0·14	5 37	5·87	8·50
Beltana	0·46	5 89	6·12	9·65
Blinman	0·74	7·75	8·80	12·61
Tarcoola	0·44	2·44	5·26	7·91
Hookina	0·90	7·47	9·38	13·60
Hawker	1·32	9·96	9·02	12·93
Wilson	1·59	8·50	8·72	12·56
Gordon	1·18	5·79	7·89	11·60
Quorn	1·32	9·63	9 90	14·24
Port Augusta	0·96	5·46	6·56	9·68
Port Augusta West	0·82	5·13	6·55	9·74
Bruce	0·99	5·72	7·20	10·76
Hammond	1·52	9·15	9·05	11 90
Wilmington	1·96	13 62	12 83	18·44
Willowie	1·95	9·31	8·45	12·44
Melrose	2·94	19·96	15·56	23·88
Booleroo Centre	2·12	13·28	10·72	15 67
Port Germein	1·54	8·91	8·80	12·93
Wirrabara	1·94	14·73	13·75	19·85
Appila	1·78	11·11	10 08	15·01
Cradock	1·41	7·67	7·85	11·50
Carrieton	1·43	9·91	8·82	12 91
Johnburg	1·06	6·67	7·21	10·85
Eurelia	1·48	9·44	9·26	13·56
Orroroo	1·46	8·51	9 56	13·75
Nackara	0·61	5·46	8 33	11·85
Black Rock	1·41	10·75	8·71	12·73
Ucolta	0·78	5·58	8·28	12·10
Peterborough	1·53	10 08	9·05	13·53
Yongala	1·94	10·38	9·73	14·51
Lower North-east				
Yunta	0·37	3·59	5·87	8·93
Waukaringa	0·43	4·47	5·97	8·61
Mannahill	0·70	3·88	5·82	8·79
Cookburn	0·16	4·00	5·65	8·42
Broken Hill, N.S.W.	0·20	0·31	6·77	10·08
Lower North.				
Port Pirie	1·21	8·01	9·32	13·55
Port Broughton	1·56	9·82	9·10	14·27
Bute	1·78	11·84	11·26	15·80
Laura	2·11	14·35	12·39	18·25
Caltowie	2·09	13 34	11·43	17·19
Jamestown	2·40	14·35	11·94	17·86
Bundaleer W. Wks.	2·06	13·49	11·94	18·05
Gladstone	2·36	15·97	10·87	16·22
Crystal Brook	2·11	11·28	10·95	15·93
Georgetown	1·98	15·64	12·68	18·50
Narridy	1·25	11·18	12·36	16·43
Redhill	1·41	11·19	13·07	16·93
Lower North—*continued.*				
Spalding	1·91	10 62	13·43	20·41
Gulnare	1·88	13·04	13·01	19·34
Yacka	1·62	10·56	10·69	15·45
Koolunga	1·46	10·25	11·07	15·87
Snowtown	1·81	10·90	11 37	16·05
Brinkworth	1·70	11·41	11 09	16·26
Blyth	2 10	12·58	11·65	16·9
Clare	3·96	21·08	17 26	24·6
Mintaro	3·78	21·84	16·31	23·4
Watervale	4 05	21·51	19·52	27·44
Auburn	3·18	17 56	17·02	24·30
Hoyleton	2 03	11·53	12 36	17·85
Balaklava	2·17	10 60	11·03	15·91
Port Wakefield	1·31	9·22	9·56	13·29
Terowie	1·37	8 02	9 10	13·78
Yarcowie	1·29	7·46	9·56	14·18
Hallett	1·96	11·59	11 03	16·47
Mount Bryan	2·28	14 26	11 28	16 74
Koorainga	2 02	10·96	12 44	18·06
Farrell's Flat	2·74	14 58	13 22	18 97
West of Murray Range.				
Manoora	3 08	16·17	12 73	18·78
Saddleworth	2·94	16·52	13·74	19·74
Marrabel	4·08	19·89	13·69	19·67
Riverton	4·41	20 25	14 46	20 71
Tarlee	3 43	19 34	12·25	17·81
Stockport	2 72	18·17	11·19	16·49
Hamley Bridge	2·87	17·57	11·38	16·52
Kapunda	2·72	17·75	13·76	19·80
Freeling	2·41	17·80	12·34	17·90
Greenock	3·65	21·71	13·83	21·60
Truro	2·50	19 01	13·96	20·80
Stockwell	2·44	19·82	14·00	20·31
Nuriootpa	2·56	18·56	14·56	20·99
Angaston	2·58	21·51	15·62	22·48
Tanunda	3·26	21·87	15·57	22·20
Lyndoch	4·54	27·68	16·02	22·88
Williamstown	4·06	27·63	19·90	27·47
Adelaide Plains.				
Mallala	2·40	16·40	11 21	16·66
Roseworthy	2·52	17·45	11·98	17·29
Gawler	3·01	17·91	13·44	19·09
Two Wells	2·14	15·12	11·31	15 83
Virginia	3·01	17·21	12·26	17·31
Smithfield	3·76	19·29	11·95	17·16
Salisbury	2·73	20·30	10·99	18·45
North Adelaide	2·63	20·82	15·91	22·22
Adelaide	2·26	18·55	15·22	20·05
Glenelg	1·97	14·29	13·30	18·37
Brighton	2·91	17·46	15·11	21·34
Mitcham	2·70	23·26	18·14	24·06
Glen Osmond	3·43	25·49	18·77	25·78
Magill	3·46	26·18	18·28	25·24

RAINFALL—*continued*

Station.	For Aug., 1923.	To end Aug., 1923.	Av'ge. to end Aug.	Av'ge. Annual Rainfall
Mount Lofty Ranges.				
Teatree Gully	3·31	30·37	19·70	27·65
Stirling West	6·14	44·84	34·09	46·59
Uraidla	5 94	43·86	32 39	43·92
Clarendon	4·52	29·24	24 05	32 98
Morphett Vale	2·33	18·80	16·37	22·79
Noarlunga	1·89	18 98	15·80	20·35
Willunga	2·81	21·84	18 92	25·89
Aldinga	2 39	16 16	15 02	20·35
Myponga	3·05	23·98	21·18	29·16
Normanville	3 87	18·93	16·22	20·61
Yankalilla	3·66	22 51	17·13	23·10
Mount Pleasant	3·84	27·83	19·35	27·16
Birdwood	4·03	29·99	20·98	29·33
Gumeracha	4 53	36·18	21·20	33·29
Millbrook Reservoir	5·13	37·17	—	—
Tweedvale	5·39	36·33	25·72	35·55
Woodside	4·05	30 00	22·90	32·11
Ambleside	4·79	33·28	24·70	34·67
Nairne	3·25	23 96	20 09	28·42
Mount Barker	4·53	30·98	22·21	31 18
Echunga	4·40	32·84	23·65	32·96
Macclesfield	2·99	25·83	21·42	30 57
Meadows	4·11	31·74	25·52	36·04
Strathalbyn	1·61	12·92	13·59	19·32
Murray Flats and Valley.				
Meningie	1·89	16·13	13·33	18·66
Milang	1·28	10·07	12·95	15·40
Langhorne's Brdg.	1·26	11·51	10·01	14·61
Wellington	1·89	10·63	10·03	14·77
Tailem Bend	1·78	10·60	9·68	14·55
Murray Bridge	1·41	8·70	9·45	13·93
Callington	1·37	11·64	10·67	15·42
Mannum	0·96	6·71	8·07	11·64
Palmer	1·54	11·53	10·36	15·47
Sedan	1·33	9·38	8·60	12·29
Swan Reach	1·58	7·17	7·23	11·09
Blanchetown	0·68	4·06	6·78	10·16
Eudunda	2·54	12·82	11·02	17·54
Sutherlands	2·19	8·37	7·40	11·19
Morgan	1·01	5·28	5·96	9·30
Waikerie	1·25	5·18	6·32	9·91
Overland Corner	0·79	4·73	7·13	11·07
Loxton	1·19	7·38	8·47	12·63
Renmark	1·01	5·85	7·97	11·09
Monash	0·93	6·58	—	—
West of Spencer's Gulf.				
Eucla	1·27	4·37	7·78	10·02
White Well	0·69	4·12	6·57	9·08
Fowler's Bay	1·41	10·45	9·48	12·16
Penong	2·15	9·63	9·62	12·49
Ceduna	1·40	8·07	7·39	10·36
Smoky Bay	1·94	11·33	8·08	—
Petina	2·30	10·76	9·48	13·34
Streaky Bay	2·40	12·11	11·71	15·10

Station.	For Aug., 1923.	To end Aug., 1923	Av'ge. to end Aug.	Av'ge. Annual Rainfall
West of Spencer's Gulf—*continued*.				
Talia	2·42	12·59	11·13	16 45
Port Elliston	2·27	15·15	12·82	16·55
Cummins	3·03	15·24	13·87	18·90
Port Lincoln	2·83	14·97	14·80	19·72
Tumby	1·86	8 26	10 02	14·76
Carrow	0·95	8 02	9·36	14 18
Arno Bay	0·71	8·27	8·84	13·30
Cowell	0·41	4·98	8 17	11·75
Yorke Peninsula.				
Wallaroo	1·04	9·84	10·37	14 18
Kadina	1·59	12·21	11·75	16·05
Moonta	1 51	11·06	11·32	15·38
Green's Plains	2·08	13 40	11·57	18·89
Maitland	3·04	17·88	14·74	20·15
Ardrossan	2·14	11 49	10·18	14·11
Port Victoria	2·79	14·29	10 40	15·47
Curramulka	2·55	14·55	13·20	18·22
Minlaton	3·74	16·85	13·13	17·91
Brentwood	2·26	14·25	11·38	15·83
Stansbury	2 55	15·24	12·16	17·04
Warooka	2 85	18·13	13·24	17·81
Yorketown	2 66	14·77	12·88	17 26
Edithburgh	2 15	13·32	12 07	16 58
South and South-East.				
Cape Borda	3 61	19·98	19·65	25·10
Kingscote	2·63	16 46	14 27	19 10
Penneshaw	2·07	12·81	13·57	19·39
Victor Harbor	2·49	15·71	15·40	21·45
Port Elliot	2 59	15 17	15·38	20·26
Goolwa	1·54	12·50	12·73	17·87
Pinnaroo	1·56	12·56	10·33	15·66
Parilla	1·62	11·60	9·39	14·65
Lameroo	2·03	13·04	10·55	16·37
Parrakie	1·50	11·66	9·42	14 54
Geranium	2·05	12·80	11·01	16·19
Peake	1·80	11·38	11·25	16·58
Cooke's Plains	1·90	12·75	10·32	15·04
Coomandook	1·72	11·32	12·04	17·48
Coonalpyn	1·92	14·17	11·99	17·42
Tintinara	1·55	16·21	12·62	18·60
Keith	1·70	14·40	12·11	18·17
Bordertown	1·48	14·60	13·04	19·44
Wolseley	1·69	16·01	12·21	18·12
Frances	2·43	16·42	13·06	19·78
Naracoorte	2·34	17·83	14·98	22·52
Penola	2·73	19·24	18·27	26·29
Lucindale	2·97	18·98	16·35	22·95
Kingston	2·69	18·85	18·65	24·47
Robe	2·40	19·95	18·71	24·59
Beachport	2·53	17·99	20·87	20·24
Millicent	3·33	25·29	21·76	29·36
Kalangadoo	3·56	26·02	—	—
Mount Gambier	2·97	20·86	22·01	31·24

AGRICULTURAL BUREAU REPORTS.

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Branch.	Report on Page	Dates of Meetings	
		Sept.	Oct.
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Allandale East	202	21	26
Amyton	‡	24	22
Angaston	*	—	—
Appila-Yarrowie	*	—	—
Arthurton	180	—	—
Ashbourne	‡	—	—
Balaklava	*	8	13
Balhannah	‡	21	19
Barmera	190	25	22
Beetaloo Valley	168	—	—
Belalie North	*	22	20
Berri	‡	26	24
Big Swamp	‡	—	—
Blackheath	A.M.	28	26
Black Springs	‡	—	—
Blackwood	*	17	15
Block E	190	—	—
Blyth	176	1	6
Booleroo Centre	170	21	19
Borrika	*	—	—
Brentwood	*	20	25
Brinkley	*	22	20
Bundaleer Springs	*	24	22
Bute	*	25	23
Butler	A.M.	—	—
Calca	*	—	—
Cadell	*	—	—
Canowie Belt	*	—	—
Carrow	181	20	25
Cherry Gardens	190	25	23
Clanfield	*	—	—
Clare	A.M.	21	19
Clarendon	*	24	22
Claypan Bore	*	26	24
Cleve	*	19	24
Collie	‡	22	27
Colton	*	28	26
Coomandook	‡	19	24
Coomalpyn	*	28	26
Coorabie	181	—	—
Cradock	*	—	—
Crystal Brook	‡	21	19
Cungena	184	—	—
Currency Creek	192	28	26
Cygnet River	194	20	25
Darke's Peak	181	19	6
Denial Bay	*	—	—
Edillilie	184	29	27
Elbow Hill	A.M.	25	30
Eurelia	‡	14	19
Farrell's Flat	*	21	19
Frances	A.M.	29	27
Gawler River	*	24	22
Georgetown	*	22	20
Geranium	190	29	27
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Glencoe	203	—	—
Glossop	*	29	24
Goode	*	26	24
Green Patch	‡	24	22
Gumeracha	*	24	22
Halidon	*	26	24, 27
Hartley	*	—	24
Hawker	*	25	23
Hilltown	*	—	—
Hookina	166	20	25
Inman Valley	*	—	—
Ironbank	‡	22	20
Kadina	*	—	—
Kalangadoo (Women's)	‡	—	—
Kalangadoo	‡	8	13
Kangarilla	‡	—	—
Kanmantoo	*	22	20
Keith	*	—	—
Ki Ki	*	—	—
Kilkerran	176	20	25
Kimba	*	—	—
Kingscote	*	—	—
Kingston-on-Murray	*	—	—
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Koonibba	*	21	19
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Longwood	‡	—	—
Loxton	*	—	—
Lucindale	*	—	—
Lyndoch	170	20	25
McLachlan	184	1	6
MacGillivray	*	25	23
Maitland	*	20	25
Mallala	A.M.	17	15
Maltee	‡	21	19
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Mannanarie	—	—	—
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Meningie	*	--	—
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Moorook	*	21	26
Morchard	*	22	20
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Mount Bryan	168	—	—
Mount Byran East	*	—	—
Mount Compass	*	—	—
Mount Gambier	202	8	13
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Mount Remarkable	*	—	—
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Myponga	*	—	—
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Naracoorte	A.M.	8	13
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Narrung	‡	22	27
Neeta	*	—	—
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Netherton	‡	21	19
North Booborowie	‡	25	23
North Bundaleer	*	—	—
Northfield	*	—	—
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O'Loughlin	‡	19	24
Orroroo	166	—	—
Owen	A.M.	21	19
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Parrakie	*	—	—
Paruna	*	—	—
Paskeville	180	21	19
Pata	*	—	—
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Petina	A.M.	29	27
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Pompoota	190	12	10
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Port Elliot	202	15	17
Port Germein	*	1, 29	27
Pygery	A.M.	22	20
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Redhill	‡	25	23
Rendelsham	*	19	24
Renmark	*	20	25
Riverton	*	—	—
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Salt Creek	*	—	—
Sandalwood	*	—	—
Shoal Bay	*	25	23
Smoky Bay	‡	—	—
Spalding	*	—	—
Stockport	*	—	—
Streaky Bay	*	—	—
Strathalbyn	*	25	23
Talia	182	10	8
Tantanoola	*	22	20
Taplan	186	25	23
Tarcowie	‡	25	23
Tarlee	170	25	16
Tatiara	‡	15	20
Two Wells	*	—	—
Uraidla & Summertown	*	3	—
Veitch	*	—	—
Virginia	*	—	—
Waikerie	*	—	—
Wall	*	—	—
Wanbi	*	—	—
Warcowie	‡	—	—
Watervale	176	—	—
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Wilkawatt	189	22	20
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Windsor	176	25	23
Winkie	190	24	22
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Wirrulla	A.M.	22	20
Wolowa	*	—	—
Wudinna	‡	22	20
Wynarka	*	—	—
Yabmana	*	—	—
Yacka	*	25	23
Yadnarie	182	18	23
Yallunda	‡	—	—
Yaninee	*	—	—
Yeelanna	‡	22	20
Yongala Vale	*	—	—
Yorketown	*	—	—
Younghusband	190	27	25

* No report received during the month of August. ‡ Held over until next month. † Formal.
A.M. Annual meeting.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

HOOKINA (Average annual rainfall, 12in.).
July 26th.—Present: 11 members and four visitors.

CARE AND MANAGEMENT OF HORSES.—The Hon. Secretary (Mr. A. J. Heneschke) read a paper from the *Journal of Agriculture*, and, in the discussion that followed, Mr. J. H. Westrop expressed the opinion that one man should only be expected to look after one team, so that he would have the opportunity of understanding the temperament of each horse in the team. Mr. H. V. Heneschke considered that the next 10 years would see the horse entirely replaced by the tractor for farm work. Mr. B. A. Murphy was not in favor of the tractor for that district, because the horses could be fed very cheaply, whereas the tractor required feeding every time it was worked. Mr. A. J. Heneschke stated that no farm could be worked without the assistance of horses, but where two teams were employed he thought the tractor could be worked with advantage.

WILMINGTON (Average annual rainfall, 18.36in.)
June 27th.

Mr. H. Duhring read a paper, "Workmen's Compensation Act and Insurance Policies," in which he expressed the opinion that every man should have an accident policy, which could be shown to the farmer before he hired any labor. Such a practice would protect the employer against accidents that happened to the workman whilst employed on the farm.

PLANTING AND FIRST PRUNING OF FRUIT TREES.—A further meeting was held on July 9th when a paper dealing with the above subject was contributed by Mr. E. L. Carlyon. The speaker favored planting the young tree in the natural orchard soil without previous preparation. After a good application of stable manure had been made to the orchard the land should be ploughed or turned over with a spade. At the commencement of the summer months a thick layer of stable manure should be placed around the butt of each tree to save as much water as possible. It was the speaker's contention that ordinary orchard soil, with a liberal application of manure, produced fruit of as good a quality as ground which received a costly preparation. Referring to the various methods of pruning that were practised, the speaker favored the plan of cutting back hard during the first season in order to be able to make a nucleus for the formation of a shapely tree. He believed that it was a mistake to allow the trees to bear fruit during the early years of their growth, because the young trees were not able to supply nourishment for the roots as well as for the fruit. Hard pruning and proper care during the first season or two would make a vigorous and healthy tree.

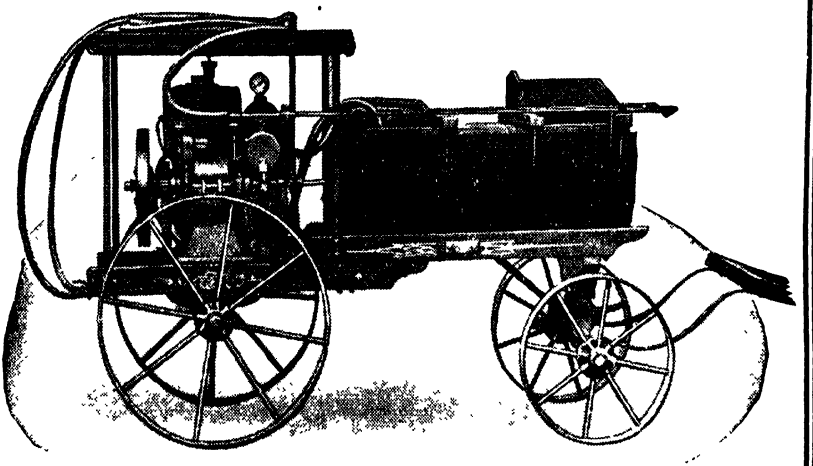
ORROROO, August 4th.—The delegates to the Morchard Conference gave a report of the proceedings of the various sessions, and several other matters of local importance were brought before the meeting for discussion.

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MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

BEETALOO VALLEY (Average annual rainfall, 23.50in.).

July 25th.

ROAD MAKING.—Mr. J. Richards, who read a paper dealing with this subject, said a new road should be made 56ft. wide, with a crown of 18in. and a gradual slope to both sides, in order to drain all the water off the road. A 16ft. wide metal bed should be made in the centre of the road, and given a cross fall of 4in. He considered that good hard stone or hard limestone made the best road. Six inches of metal, broken down to a 6in. gauge, should be placed in the bed of the road, and on top of that 6in. of 2½in. gauge should be added and made with a shoulder 3ft. in width. Blinding could be done with good rubble or sandy soil. Side cuttings should be 30ft. wide, to allow plenty of room for vehicles to pass one another All the earth should be scooped in the centre of the road, and made with an 18in. crown and a cross fall of 6in. to drain the water to the sides. The road should be rolled, and a drain 2ft wide and 1ft. deep made to carry the water from one spoon drain to another. Fords over creeks should be made 25ft. wide, and formed with an 18in. crown in the centre to drain the water to each side. Posts for the ford should be placed 4ft. in the ground, and bedded in concrete, the logs being fastened to the posts with strong bolts. After the posts had been set in position, the logs should be placed in the bed of the creek. The fall of the creek could be considerably raised by placing another row on top, and then filling up the bed of the creek with metal. Another row of logs could be placed 15ft. below the first row, and if pitch paved between both rows of logs with large stones, a good water shed would be formed, and much would have been done to prevent large holes washing out below the logs.

MOUNT BRYAN (Average annual rainfall, 15.81in.).

July.—Present: six members and visitors.

TRACTOR *v.* HORSES.—Mr. J. L. Quinn, who read a short paper on this subject, expressed the opinion that the tractor could claim many advantages over the team of horses, the main items being that the tractor was able to dispense with the haystack, chaffcutter, engine, stables, harness, and other necessaries required in connection with a team. The tractor also enabled one man to crop 300 to 400 acres with very little assistance. Where the tractor was employed, time was saved in not having to feed a team of horses in the mornings, dinner hours, and evenings, and there was also the advantage of being able to work the implements at a regular pace. As an illustration he cited the case of a 15.27 horse-power tractor which was able to drill and cultivate 30 acres a day with a combined drill and cultivator, whereas 14 horses, working a 20-hoed drill and 17-tyned cultivator, could only cultivate 20 acres per day. He was of the opinion that 500 acres of land could be put under crop with the tractor for £35, but it would cost £80 to do the same work with a team of horses. The tractor also solved the problem of employing constant labor, and did away with the heaviest and most objectionable work on the farm, *i.e.*, hay carting and cutting. There were, however, two disadvantages against the tractor, first, that of working boggy and wet land, and secondly, the carting of the wheat. The first was a very difficult matter to overcome, but the second could be overcome by carting the wheat into a heap close to the road so that when reaping was finished, the grips on the wheels of the tractor could be changed and the machine used to draw the wheat into the station.

NELSHABY.

July 23rd.—Present: 11 members and visitors.

CARE OF FARM MACHINERY.—Mr. T. D. Haines, who read a short paper dealing with this subject, said farm machinery was so expensive that the farmer should take every reasonable care of it. When the harvester or binder had finished work in the field it should be immediately taken to the homestead and placed under cover. Prior to starting work in the paddocks, each machine should be over-

hauled, worn and broken parts replaced, and all oil holes and bearings cleaned out to take the oil. It was a good plan when there came a damp day during harvest, to go over the harvester, tighten all the bolts and nuts, and see that all parts were in proper working order. Special attention should be paid to the pinions. These should not be worked if inclined to slip, or they would spoil the crown. When all the crops had been reaped the harvester should be taken into the shed, and a prop placed under the off side of the comb to keep it level. In the discussion that followed members thought iron should be used on the roofs of buildings in which implements were housed, and that the wood work on all machines should be given an occasional coat of paint.

SHEEP AND WOOL.—Under this heading a paper was read by Mr. C. Plenty at a meeting held on June 2nd. The speaker held the opinion that no farm could be considered thoroughly up-to-date unless it supported a flock of sheep. When making a start with a flock of sheep, the farmer should select that breed which was best suited to the conditions in which he lived. When preparing the clip of a small flock for market, it was not advisable to make too many classes. He suggested the following classification:—All wethers above the age of hoggets, hoggets of both sexes, ewes, and finally lambs wool. The fleeces should be well skirted, care being taken not to over do that part of the work, unless the wool was very seedy or burry. If a fleece contained a "sandy back," that part should be removed and all bellies, clean or dirty, should be removed from the fleece wool. The wool should be classed more by the feel to the hands than by the sight of the eyes. If, at the first touch, the wool sorter was unable to classify a certain fleece, it should be placed back on the pile and a further examination made later on in the day. "Yolky" fleeces should not be included with first-class wool. All very dry fleeces should be examined for a break in the fibre of the wool. The first-class fleeces should be branded "A A wethers" or "ewes" as

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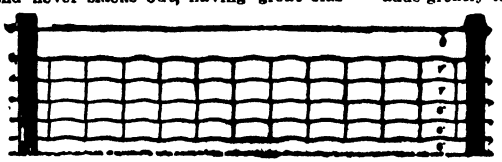


Fig. 7 Cyclone Special Spring Coil Sheep Fence.

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the case might be, in clean and distinct marks on the bales, and the bales should always be branded in the same manner, because the buyers remembered the brands and gave better value for the wool that they knew corresponded with the description given by the grower.

LAURA, July 28th.—Mr. J. F. Roenfeldt delivered an interesting and instructive address, "The care and Treatment of Harness." A good discussion followed and the speaker replied to a number of questions.

BOOLEROO CENTRE, July 27th.—Mr. Mills read a paper "Mixed Farming," and an interesting discussion followed. Several other items of local importance were also brought before the meeting for discussion.

WHYTE-YARCOWIE, June 9th.—Mr. G. McGregor read a paper, "The Divining Rod," and an interesting discussion followed. Matters in connection with the annual meeting were also brought before the meeting.

WHYTE-YARCOWIE, July 20th.—After the report of the work performed by the Branch had been presented by the Hon. Secretary (Mr. E. J. Pearce), and the officers elected for the ensuing year, the Wool Instructor of the School of Mines (Mr. A. H. Codrington) delivered an address, "Points in Connection with the Wool Industry."

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

LYNDOCH (Average annual rainfall, 23.01in.).

July 13th.

PRUNING COMPETITIONS.—A very successful pruning competition was conducted under the auspices of the Lyndoch Branch of Agricultural Bureau at Messrs Springbett Bros.' Hillside vineyards. The following are the results:—"Rod pruning," 11 contestants—Messrs. A. Linton, 81 points, 1st; W. Bishop, 78 points, 2nd; H. Taylor, 77 points, 3rd. "Spur pruning," 14 competitors—Messrs. L. Harper, 90 points, 1st; A. Linton, 88 points, 2nd; G. King, 86 points, 3rd. The South Australian Gas Company presented a Silver Cup known as the "The Sulphate of Ammonia Cup" for the highest aggregate points in rod and spur pruning, Mr. A. Linton being the winner with 169 points. The prize money was donated by the winemakers operating in the district. The judges were Mr. Geo. Quinn (Government Horticultural Instructor), and Messrs. L. N. Salter and C. M. Pollitt.

SADDLEWORTH (WOMEN'S) (Average annual rainfall, 19.69in.).

August 14th.—Present: eight members and 12 visitors.

Mrs. Wakeham, J.P., a foundation member of the Riverton Women's Branch of the Agricultural Bureau, attended the meeting and delivered an address, in which she detailed some of her experiences in the North Island of New Zealand, where she had recently spent a seven months' holiday.

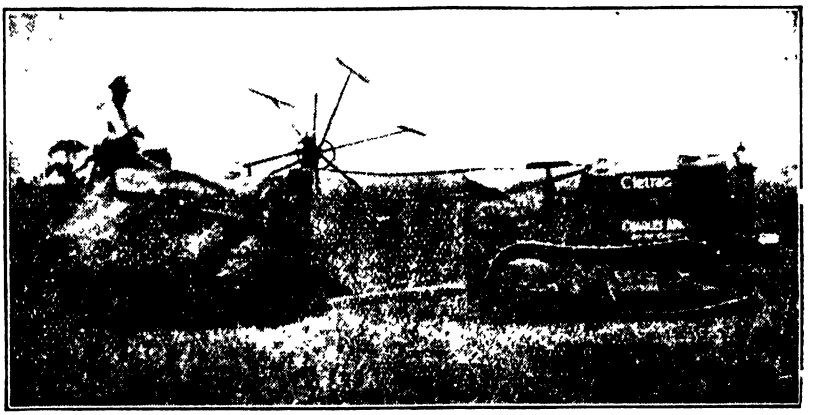
TARLEE.

May 1st.—Present: 18 members and three visitors.

CROP COMPETITIONS.—The following paper under the heading "Benefits to be Derived from Crop Competitions" was read by Mr. W. Clarke:—"To derive the most benefit from crop competitions it will be essential for the farmer, who has entered for the competition, to give full history of the growing of the crop, such as how and when the land was broken up for fallow, and how the land has been worked since it was broken up, when the crop was sown, and the quantity of both seed and manure used per acre, also the kind of wheat sown; and for this to be published, with the results of the competitions and the judge's observations and recommendations, so that the farmer, who has similar land and rainfall, can study those methods and compare them with his own. Until recently, the majority of Australian farmers have given more attention to the pioneering

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problems in the development of the land than they have to the raising of the standard of farming methods. Especially is that so in the newly opened areas, and the success that has generally been achieved by this method has given impetus to the opening up and settling of new land. Here and there, however, will be found farmers who, through their own initiative, or through following the scientific lead of others, such as Agricultural Colleges or Government Experimental Farms, and adopting what is suitable to local conditions, have done amazingly well, and one of the methods of bringing these successful farmers and their methods under the notice of the farming community is through the medium of crop competitions. Of course, there are other ways of distributing this knowledge, such as through the rural press or the Agricultural Bureau, but the continual success in public competition of crops grown by certain methods will point to their advantage, and unless the farming community is too conservative and inclined to keep to the old customs, they would at once start to study those methods of cultivation, variety of seed, quantity of manure, and commence to apply those methods to the benefit of themselves and the State. It can readily be demonstrated that new facts can be discovered by the scientist and the best farmers more quickly than they can be disseminated, and one of the benefits of crop competitions will be to help spread these facts. In the Wimmera district in Victoria, crop and fallow competitions have been conducted for a number of years and they have not been content with that, but also have a competition for the best farm, which helps to promote a healthy rivalry, which must have a beneficial effect on the community in which it is conducted. At Nhill, one of the towns in the Wimmera district, they have had their twenty-first competition, and Mr. H. A. Mullett, B.Sc. (Agric.), the judge of the last season's competition, stated 'that in the percentage of farmers who have adopted practices fundamental for heavy crop production Nhill leads the way.' Following the lead given them by Nhill, 12 other Wimmera and mallee centres now hold similar competitions. These competitions have been conducted by the different Agricultural Societies, and the success of them can be best judged by the improvement of the crops grown in these districts. The Wimmera has a reputation for producing 40bush. crops over a large area. It should also be made clear that the average for the whole area is not 40bush., but the average yields for the counties in the Wimmera are far higher than the rest of Victoria. For instance, the county of Borung in the 1921-22 harvest, where 359,000 acres were sown to wheat, the average per acre was 28bush. The average for the whole of Victoria for that year was a little over 16bush. Many individual farmers in the Wimmera, however, have frequently obtained 40bush. and more per acre during recent years. For instance, the winner of the Rupanyup three years' crop competition, which comprised at least 100 acres annually for the years 1920, 1921, 1922, was Mr. R. J. Jackson, whose yields were—1920, 265 acres, averaging 43bush.; 1921, 265 acres, averaging 43bush.; and the 1922 crop of over 275 acres was estimated to have been nearly 40bush. This is only one instance of many and it is due to the improved methods of cultivation, for 10 years ago the black Wimmera soil was not regarded as being so productive as it is to-day. The Wimmera Agricultural Societies have gone much further than any others with crop competitions in bringing to light the best crops each year in the different districts and in giving publicity to the methods by which those crops have been raised. The result is that there are a greater proportion of men farming according to the best known methods in the Wimmera than in other wheat areas. But to show the true rate of progress in the Wimmera since the establishment of the Nhill crop competition 21 years ago, we will compare the average yield per acre before and after the period, taken in periods of five or six years; omitting 1902 and 1914, which were years of drought, when little or no wheat was harvested. In the period of 1897 to 1901 the area sown, 640,000 acres, averaged 7.6bush. per acre; 1903-1907, 624,000 acres averaged 12.4bush. per acre; 1908-1913, 617,000 acres averaged 14.8bush. per acre; 1915-1920, 680,000 acres averaged 19.1 bush. per acre—a net increase of 11.5bush. per acre. The period 1903 to 1907 was the period in which superphosphate and fallowing were introduced, but despite the fact that no other great discoveries have been made comparable with them since then, the advances have been just as great as before. It was a period of careful exploration of most of the factors involved in local wheat cultivation, and of the propagation of the discovered facts from experimental fields and

advanced farms to farmers at large, in which crop competitions played an important part. In the Northern district, which is the only other district in Victoria with an equal area and similar rainfall to the Wimmera, the net increase over the same period has been 3.4bush. The soils are somewhat different, but it cannot be argued that there is more good land under cultivation in the Wimmera soil than in the Northern district. During the same period there was no organised method of ascertaining the best local practice and giving publicity to it, and there is this to learn from Victoria, that although the same scientific discoveries were available to both, the Wimmera district, which has fostered crop competitions, has increased its yield far ahead of any of the other districts With reference to our own State. Last year the Maitland Branch of the Agricultural Bureau held its first crop competition, and although there was no reference to the fallowing or the seeding operations for the farmer to compare with his own work, the judge, Mr. W. J. Spafford (Superintendent of Experimental Work) in his observations and recommendations stated that in connection with the competition extremely good wheat crops were seen, but much improvement could still be made by more attention to details, which was quite necessary if maximum crops were to be aimed at. In some of the crops entered for competition, as well as in many other crops in the district, quite a number of controllable weaknesses were in evidence, all of which did something towards reducing the returns secured from the land. Amongst the worst of these troubles were—Bunt or smut, take-all, and flag smut, the introduction of bad weeds, such as barley and drake with the seed, wheats grown which were badly mixed with other varieties, too little seed used where the weeds had not been killed when fallowing, insufficient fertiliser, and the presence of eelworms in the cereal crop. The majority of these weaknesses are spread over the wheat-growing area in the State, and Mr. Spafford not only mentioned them, but he also told how each one could be controlled, so that the Maitland competition should be a benefit to any farmer who has read Mr. Spafford's report and is suffering from some of those troubles. The Maitland district will benefit more than the rest of the State, for it will be brought home to them more through the competition being held there, that these things can be controlled, and also anyone wishing to enter in that competition in future will realise that they will have to control those weaknesses before doing so if they wish to win the competition. They also have the benefit in having a local crop competition, because it affords the opportunity of seeing the success of improved practices by direct personal illustrations, which are the greatest benefit of crop competitions." Mr. M. Clarke also read extracts from the *Agricultural Gazette* of New South Wales dealing with crop competitions in New South Wales. An interesting discussion followed the reading of the papers.

WILLIAMSTOWN (WOMEN'S).

June 6th.—Present: 22 members.

COOKING.—In the course of a paper under the heading "Inexperience in Cooking," Mrs. Woolford said it was surprising the number of women—both old and young—who were to all intents and purposes ignorant of the general rules of cooking. For such people the writer of the paper considered that a cooking recipe book would be a most welcome and necessary addition to the household library. Mrs. Woolford first referred to the cooking of meat, which, she said, should not be cooked hurriedly. It should be put in the oven in plenty of time for the meal, and after it had commenced to cook, the heat of the stove could be reduced so that the meat would cook slowly. The fire, of course, required attention to see that it was not allowed to burn down too low. Meat cooked slowly would be found to be more palatable and more tender than meat that was either boiled or roasted hurriedly. If meat was to be cooked, and it was inclined to be somewhat tough, it was a good plan, after it had finished cooking, to draw the saucepan or pot aside from the fire and allow the meat to remain in the liquid until it was nearly cold when it could be removed. Steak could be improved by cooking it over a fairly strong fire for the first few minutes. The strong fire caused a nice brown crust to form on both sides of the steak and prevented the juice of the meat from escaping, which improved the taste of the meat. If a little cold meat was on hand, a tasty dry hash could be made from the following recipe:—"Cut the meat into small pieces, cover it with water, season with salt and pepper, taking care to keep it well stirred. After being about one hour

to an hour and a half on the stove, potatoes and onions could be added, the stirring being continued. When the potatoes are cooked, take a prong and mash them well, then stir the whole together and leave it on a grate so that is will not burn. It can then be served with any other vegetables that have been boiled separately.'' Another way of using cold meat was to put the meat through a mincer and then into a pie dish, over which a crust of mashed potatoes should be made, and then cooked until the potatoes were nicely browned. An enjoyable dish—salmon pie—could be made in the same way, but, of course, there was no need to put the fish through the mincer. During the summer, cold meat bones kept from about Thursday until the end of the week could be placed in the boiler or saucepan, covered with water and then seasoned with plenty of salt and pepper. They should be allowed to boil for several hours, then taken off and strained first through the colander, and then through the gravy strainer. The liquid should be allowed to ''set'' all night, when the fat should be removed, and the result should be a most palatable jelly which could be eaten with cold meat instead of pickles, beetroot, &c. A peeled and cored apple cut into small pieces made an excellent flavoring for soup. The flavor of potatoes was considerably improved by adding a small quantity of sugar to the water in which they they were boiled. Carbonate of soda boiled with peas had a tendency to soften peas that were old and hard. Carbonate of soda also softened cabbage and gave it a nice flavor. To give the cabbage a nice color the lid of the cooking utensil should be removed whilst the cabbage was being boiled. Carrots and parsnips took some little time to cook properly, and for that reason they should be placed over the fire before other vegetables. All vegetables grown above ground, such as cabbages, cauliflowers, peas, beans, &c., should be placed in boiling water, while all root crops should be immersed in cold water and then boiled. A further meeting was held on July 4th, when several cooking recipes were discussed.

WILLIAMSTOWN (WOMEN'S).

August 1st.—Present: 18 members and visitors.

VEGETABLES AND HOW TO SERVE THEM.—Mrs. D. Coleman read the following paper:—''The important part which the consumption of vegetables plays in connection with our general health cannot be too highly estimated. Indeed, if we were more alive to this fact, many illnesses could be avoided. Onions are amongst the most healthful vegetables and should be consumed a great deal more than is the custom. All root vegetables may be kept fresh for a considerable length of time by planting and covering them with fresh moist earth. Beans and vegetables of a similar character can be kept nice and firm by placing them in a wet bag and throwing another wet bag over the inner one. On no account should the bag be allowed to become dry. Celery is one of the best foods with which we are endowed, and we cannot do better than eat of it in plenty. Beans and peas are very nourishing. Green peas are more digestible, but less nourishing than dried or full grown peas. These need to be thoroughly boiled to make them digestible. If a pinch of carbonate of soda is added to the water in which all green vegetables are boiled, it will preserve the natural color and give the cooked vegetable a more attractive appearance than when this simple expedient is neglected. When peas are old, a dessertspoonful of sugar added to the water softens the skin and improves the flavor. Potatoes form our staple vegetable, and no doubt much of their popularity is due to the fact that they are cheap. Potatoes are not a flesh-forming food, and when depended upon to provide the chief item of diet, milk or butter must be added to make them nourishing. Salad vegetables, such as lettuce, lentils, &c., do not contain flesh-forming constituents, but are invaluable on account of their bulk and saline properties. This is unfortunately removed from most vegetables during the process of preparation. Therefore, the use of these raw vegetables in hot weather should be as liberal as possible. To prepare for cooking—Old potatoes—Scrub and dry, peel very finely and take out the eyes, drop into clean, cold water and soak for a couple of hours before cooking. New potatoes—Scrub with a coarse brush and scrape well. This should be done just before cooking. Cabbage—Cut the outside leaves off and remove the stalk and coarser part of the leaf stalk. Soak for half an hour in a large quantity of salted water. Cauliflower—Take off the outside leaves, shorten the stalk to the base of the young leaves, and soak in salted water to extract any insects. Marrow—Peel very thinly and remove the core and seeds, cut in pieces about 4in. square, and

wash. Spinach—Strip the leaves from the stalk and wash well in several waters to remove all trace of grit. Asparagus—Scrape the stalks, from the head down, with a sharp knife, and wash well. Bind in bunches, making the heads even, then with a sharp knife make a straight cut across the other end of the bunch. Carrots.—Scrape thoroughly from the thick end and peel, after boiling, by rubbing in a coarse cloth. Turnips—Peel sufficiently thickly to remove woody fibre (if any) from skin. Onions—Remove the outside dry skins and drop the onions into cold water to preserve color, and then allow them to stand in boiling water, into which half a teaspoonful of baking soda has been added. All vegetables (except spinach and old potatoes), should be placed in plenty of water. Ample salt should be added to the water in which they are cooked. One teaspoonful to every quart of water is the usual proportion. Green vegetables should be put into boiling water, with a pinch of carbonate of soda, and be boiled rapidly with the lid off the saucepan to preserve the color. Root vegetables should be put into boiling water and boiled slowly with the lid on the saucepan. The exception to this latter rule is old potatoes, which are placed into cold water. Peas should have sugar as well as soda added to the water in which they are boiled. A little mint should also be boiled with them."

WIRRILLA.

June 23rd.—Present: six members.

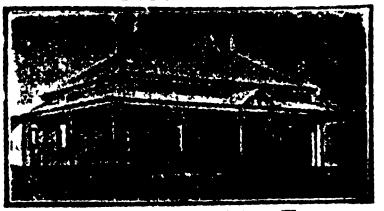
CARE OF FARM HORSES.—Mr. S. Schunke, who read a short paper dealing with this subject, said the first essential point in the care of the farm team was the erection of a warm stable. The building should face in either a northerly or easterly direction and be provided with a good solid floor. Ample provision should be made for supplies of good fodder. With the exception of the busy seasons of the year—harvesting and seeding—the team should not be worked more than eight hours each day. Before the team was harnessed in the morning each animal should be groomed with the curry comb, and care taken to see that the mane was not left under the collar. It frequently happened that 10 horses were available to work an 8-horse implement, and, in such cases, it was advisable to work all the horses and so lighten the work for the team rather than allow two horses to remain idle. If possible a small paddock should be left out for grass, in which the horses could be grazed during the spring months of the year. That would give the animals a complete spell, and give them an opportunity of putting on condition, thereby reducing the tendency to contract sore shoulders.

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BLYTH, August 4th.—In order to awaken and stimulate interest in the local Branch of the Bureau, the programme committee decided:—(1) "That competitions be held for the best samples of wheat taken from farmers' seed wheat stacks on or about April 1st, and that not less than three varieties of wheat be entered by each competitor." (2) "That a prize be awarded at the Blyth Agricultural Show for the best collection of farm produce produced on the farm by an exhibitor, who must be a member of the local Branch of the Bureau." (3) "That a prize be awarded for the paper considered to be the most instructive and beneficial to members of the Branch."

SADDLEWORTH (Women's), July 10th.—The meeting was devoted to a discussion on the subject, "Home Recipes." A number of recipes were given, and samples of scones, cockles, brown biscuits, brown bread, and sweet marmalade were exhibited. Other matters of local interest were also brought before the meeting.

WATERVALE, July 30th.—The subject "Cotton Growing" was again brought before the meeting for discussion, and Mr. N. Reid and several other members stated that it was their intention to carry out a series of experiments during the coming season.

WINDSOR, July 25th.—The Field Officer of the Department of Agriculture (Mr. S. B. Opie) attended the meeting and read a paper, "Tillage Operations." A keen discussion followed, and a number of questions were answered by the speaker.

WIRRILLA, July 28th.—Mr D. Garrett, sen., read an interesting paper, "How to Obtain the Best Results from the Farm." The report of the work performed by the Branch during the past year was presented by the Hon. Secretary (Mr. H. Schunke), and the officers were elected for the forthcoming session.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

KILKERRAN.

July 24th.—Present: eight members and six visitors.

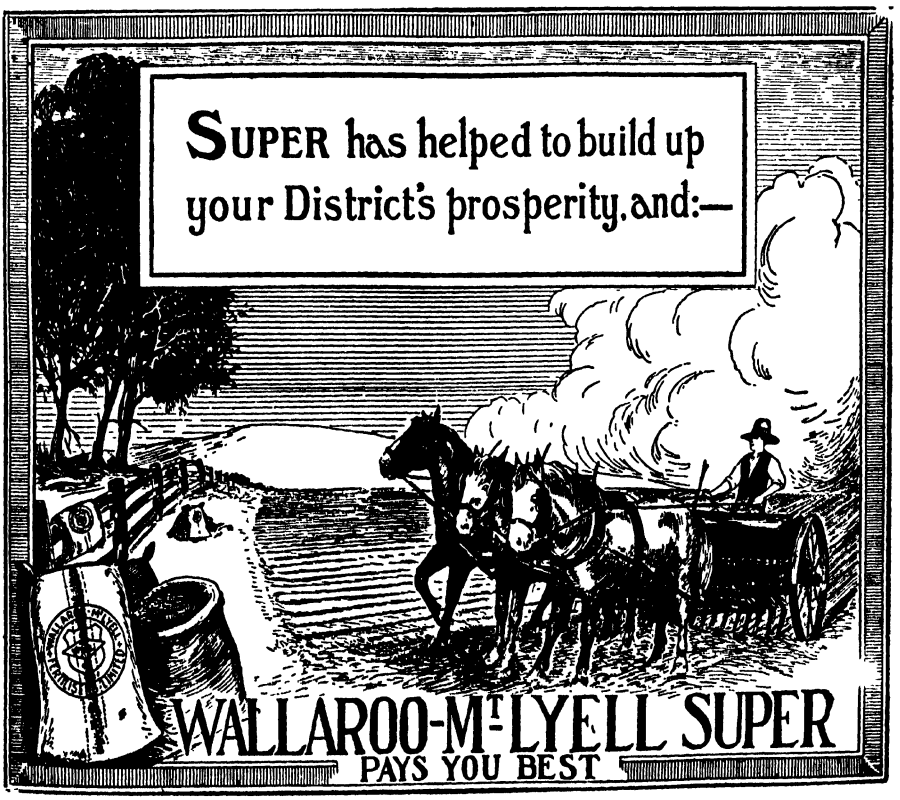
THE COMBINE *v.* DRILL AND CULTIVATOR.—Mr. S. T. Keightly, who read a paper dealing with this subject, first stated that something could be said in favor of both the combine and the drill and cultivator as means for putting in the crop. The combine no doubt effected a saving of labor, but he did not think a great deal of time was saved with that implement. Providing the farmer had sufficient strength to work the cultivator and drill and the necessary labor, he would cover more ground in less time with the two implements than with the combine. His experience had been that the combine was not a successful implement in land that was at all stumpy. The "set" of the shares prevented the bodies from releasing easily, consequently there was more strain on the tynes than there was on the ordinary spring tyned cultivator. For the farmer with a small holding and suitable land, there was no doubt that the combine was a most useful implement. But for the farmer who worked on a larger scale, and who employed labor, the cultivator and drill would be the better means of enabling him to get in his crop in the shortest possible time. The question as to which was the better implement to use was one which depended very largely on the class of land that had to be worked, and the availability of labor.

SHEEP ON THE FARM.—In the course of a paper under the title, "The Best Breed of Sheep for the Farm," Mr. C. F. G. Heinrich said the question was one that was very largely governed by climatic and soil conditions. The Merino produced the best wool and was specially suited for inland country, but for coastal and barren country the crossbred sheep was to be preferred. The crossbred also produced a better export carcase, was more hardy and less sensitive than the Merino, and was for these reasons one of the most profitable types of

sheep for the farmer who grazed a small flock. The Lincoln ram, crossed with a selected Merino ewe, produced a lamb from which a good fleece of wool could be expected. The mating of the first cross from a Merino ewe and a Lincoln ram, the second crossbred ewe to a Lincoln ram, and the third cross ewe to a Merino, produced a "Come-back," which was an excellent sheep, both for wool and mutton. The best cross for lambs for market was the Merino ewe crossed with either a Dorset Horn, Border Leicester, or Shropshire ram. In conclusion, the speaker expressed the opinion that the Merino sheep could not be surpassed in quality and weight of wool when grazed on inland country, but the Merino could not be recommended for coastal and barren country.

MOONTA (Average annual rainfall, 15.22in.).
July 28th.—Present: 18 members.

FALLOWING.—Mr. D. Kitto contributed the following paper on this subject:—"This subject is very important as far as Australian dry farming is concerned. This is realised by practically all our farming communities, as it can be seen by looking around that, although the area under wheat, &c., has slowly annually increased, the proportion of fallow under crop has greatly increased. Every farmer knows that to get the best from his land he must treat the land so as to secure the maximum amount of produce therefrom, and yet yearly maintain its fertility or yielding capacity. Since science has interested itself so much in



agriculture, the farmer nowadays has not so much need to use up his time and substance in slowly experimenting if he will but be guided by a little theory, which is obtained from other people's practical experience carefully recorded. The dictionary meaning of fallow is 'land ploughed and left unsown or rested.' It may not be properly understood that in most of our soils there is plenty of plant food in an unavailable state to the plants. This food is continually but slowly becoming available through chemical and physical actions, but not as fast, say, as a crop of wheat could use it. We fallow the land or plough it and let it rest for a while, in order that available plant food may accumulate for the next crop. By this means we get one good crop every two years, which is cheaper than one crop every year. Being satisfied, then, that there is plenty of unavailable plant food in the soil, we must consider how to work the land in order to help the various organisms and agencies at work on the raw material. If we consider the very minute root hairs on the roots of plants, through which most of the nourishment is obtained, we must clearly see that, although the soil be well stocked with food, if there be no solvent for it, the plant must die. Water is this solvent, and so the conservation of water in the soil becomes, perhaps, the main argument for fallowing in Australian dry farmed areas. I might just mention that the plant food is dissolved in the water and forced up into the plant by osmotic pressure. The surplus moisture is evaporated through the leaves and the food is retained. We know that very few plants can thrive or even live in a cold, water-logged soil owing to the lack of air, freedom for roots, &c. However, we are not much troubled with this condition on Yorke Peninsula, our concern being generally to get enough moisture. Land may be firstly prepared for fallowing by the use of sheep or a fire. Sheep are to be preferred, because practically all the plant foods they consume are returned again into the soil, thereby keeping up the strength of the soil, as well as growing a little wool and mutton. However, for the sake of doing a good job at fallowing time, it may pay to burn and clean the land to be fallowed during the previous summer—a common practice. It is reckoned by some that a good, clean burn is worth an extra bag of wheat or other cereal on the crop, more particularly when stubble is to be recropped. Of course, if land was always bare fallowed, cropped, and the stubble burnt, the supply of organic matter must eventually, if not soon, give out, and as a result practically no nitrogen would become available and nothing would grow. So it pays well to pasture the land occasionally or plough in the stubble or grass properly. Ploughing should be commenced as early as possible, which can generally be straight on from seeding operations. Seeding rains usually leave land in a good condition for fallowing, whereas a little later it frequently becomes boggy and then hard again, and fallowing can only be got on with very slowly. There is a great advantage in having as much land as possible ploughed before the heavy winter rains, because these help greatly in packing down the subsoil after it has been ploughed. The ploughing should be left in a rather rough state throughout the winter, because it allows the rain to soak in freely when it falls and not run and make the low patches boggy. The depth of ploughing must vary considerably with the conditions obtaining. Light, sandy land is usually worked shallow and heavy land deeper. It has been found by experiments that in land of a fair depth of soil about 3½in. has given the best results, although the tendency now with local farmers is to work even heavy land very shallow and often. Of course, deep ploughing in shallow soils gives a great setback by bringing up too much of the sour subsoil. I think it of advantage to just touch this raw material with the plough very rarely. The depth should also vary a little from time to time, especially in heavy land, because a sort of pan tends to form at the usual depth of ploughing, which must hinder good drainage; so by varying the depth of fallow we lessen this danger. The mouldboard fallowing plough still seems to be popular, but there are a few points in favor of the big disc fallowing plough. It may require more pulling, but it can deal more effectively with any rubbish, stones, stumps, &c., and tears the furrow slice away rather than cuts it as does the share and mouldboard. It will also more effectively deal with harder ground. As spring approaches the weeds commence to germinate and remind us that more working is required. These weeds must be killed as quickly as possible, because they at once draw food and moisture from the soil. Here again sheep come in very useful, because they will hold the weeds in check, while the land is quickly worked back. Sheep also greatly improve conditions by packing the subsoil further down. Whilst

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working the land to kill the weeds, we are also aerating the soil, conserving moisture, and assisting the agencies at work on plant foods. The depth of this cultivation should be shallower than the fallow, and leave the surface more level and finer, because heavy rains would now be over. The light mouldboard twin cultivator is very popular for this second main working, because it is a sure weed killer and may cover up any hard patches missed in the fallowing. As the weather becomes warmer, more attention must be paid to the condition of the surface of the fallow, otherwise evaporation will take place rapidly. It may be as well at this juncture to make mention of the movements of soil water as affected mainly by evaporation. Under natural conditions soils do not long continue in a wet state. Much water drains away, principally due to gravitation, but some is soaked up by the soil particles themselves, and some is held in a film form around each particle. This latter film moisture is that from which the plant draws its supplies. The retention of this moisture in the film form is due to surface tension, which causes suspended liquid to shrink to the shape of a sphere and exert a pressure towards the centre. For example, a small drop of water or any liquid will take the form of a sphere in the air or on a very smooth surface. When the rain falls each soil particle becomes covered with a film, which forms an elastic envelope. The smaller the quantity the thinner the film, the tighter it clings and the greater the pressure towards the centre. As rain continues this film becomes thicker, the tension less, and some of the water lodges into the pore space, and so drains away until a state of equilibrium is reached—the tension or pull of the film balancing the pull of gravity. If any moisture is used up in any region by root hairs or evaporation the tension is then increased, and so water is drawn from around and kept evenly distributed as long as possible. As this movement takes place most readily in a firm, damp soil because of closeness of the particles, the films are unbroken and so are just like one continuous network of films; the reverse takes place in a loose, open, dry soil, and this is the secret of keeping the moisture down in the soil and is how the surface of the fallow should be kept throughout the warm weather. When it rains this fine, loose surface at once becomes set again and ideal for evaporation, and so the harrows or some light implement, such as a spring tooth cultivator, should be run over the soil quickly as soon as the land permits working, in order again to loosen up the surface and restore the mulch. The deeper the mulch the more effective will it be. If we have a deep mulch formed and receive a shower of rain it may probably not be enough to soak through the mulch and soon is dried up again. Hence one reason for shallow mulches. Another important reason is the fact that wheat requires a firm seed bed, and so we must not loosen it too deeply, else rolling would have to be done at seeding time. As seeding time comes around again the farmer can have a large area ready to be quickly, easily, and properly drilled in with cultivator and drill, or the combined implement, as he chooses, and before long the crops will show and repay those who have given their fallows a fair go." During the discussion which followed Mr. J. Atkinson said that different soils required different treatment. On a sandy country they could not fallow at all on account of drift, and drift had been caused by some ground being worked to a fine tilth. Mr. P. Ford did not favor the disc plough. Mr. E. C. Atkinson thought the disc plough was a very fine implement for fallowing purposes, because it always made a good seedbed. Different soils required fallowing at different times. He thought farmers should know when the different soils should be fallowed. Mr. A. B. Ferguson said he had great faith in scientific farming. They did not fallow to conserve moisture only, but also to kill the weeds. He preferred shallow working, and would work the ground with a light cultivator. Fallowing was the most essential operation for the production of good crops.

ARTHURTON, July 26th.—Mr. C. Z. Williams read a paper from the *Journal of Agriculture*, "The Use of Electricity on the Farm," and all present took part in the discussion which followed. The delegates to the half-yearly meeting of the Northern Yorke Peninsula Field Trial Society were also appointed.

PASKEVILLE, July 24th.—Mr. T. R. Brinkworth read a paper, "The Pooling of Wheat." The paper was freely discussed, and the speaker was called upon to answer numerous questions. The officers for the year ending July, 1924, were then elected.

WESTERN DISTRICT.

CARROW.

July 26th.—Present: 18 members.

HORSE *v.* TRACTOR.—Mr. H. Byrne, in opening a discussion on this subject, said the climatic conditions in Australia were particularly suitable for working tractors. Where a tractor was employed the farmer was able to dispense with the majority of the horses on the holding, and a stationary engine would not be required. Where a farmer put 250 acres under crop with a team of horses, he would be able to drill in 500 acres with the aid of a tractor. The tractor also relieved the farmer of such work as extensive preparation for water conservation, storing of fodder, and the cleaning out of stable yards. Ploughing, cultivating, and drilling could be performed more speedily with the tractor than with the horse team. He expressed a preference for the wheeled tractor rather than the caterpillar. Mr. A. Freeman said the farming and general purpose tractor, with its ability to perform a large amount of work in a short time, would be a valuable acquisition to a man who was working a farm single handed, for it could not be denied that the tractor required less attention than a large team of horses. Mr. Beare said horses were more handy, more durable, and more easily understood than the tractor. Messrs. Harrowfield, Burt, and G. Puckridge also spoke in favor of the horse. A show of hands being called for indicated that the majority of members present favored the horse.

COORABIE (Average annual rainfall, 11in. to 12in.).

Present: nine members and visitors.

At the May meeting of the above Branch the Hon. Secretary (Mr. H. V. Hobbs) read an extract from the *Journal of Agriculture*, "Some Observations on Varieties of Oats and their Cultivation in South Australia." The opinion was voiced that oat growing in that district would become more popular when varieties other than Algerian and Mortgage Lifter were introduced into the Coorabie locality. Satisfaction was expressed that new varieties, including Scotch Grey, Early Burt, and Kherson had been introduced into the district by members of the Bureau, with the idea of ascertaining their suitability to the conditions of the district.

DARKE'S PEAK.

June 27th.—Present: six members and visitors.

FALLOWING.—In the course of a paper dealing with this subject, Mr. C. Kobelt said as the main objects of fallowing were to kill the weeds and store moisture in the soil for the following crop, the work should be commenced immediately after seeding. Three inches was sufficiently deep to work heavy soils, but the farmer had to use his judgment when working sandy land. Stumps and stones should be picked off the land at the completion of fallowing and the harrows then worked crossways to the ploughing. After the weeds had germinated the culti-

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vator, should be brough[illegible] he land should be lightly worked with a [illegible] orked down to a fine tilth, but the sandy [illegible]tion [illegible] prevent drift. Mr. D. Kobelt thought the plough [illegible] d at a greater depth than 3in. in order to cover the mustard plants and to pull more stumps out of the land.

ROBERTS AND VERRAN

July 26th.—Present: seven members.

SCRUB ROLLING.—Mr. H. Smith, who contributed a short paper dealing with this subject, stated that the best time for rolling the scrub was during the months of September and October, because, as a rule, very little rain fell before the time arrived for burning. Another advantage of rolling the scrub before harvest was that it gave the shoots time to start growing, and the subsequent burn killed a large number of the stumps. He preferred the log to the roller for pulling down the scrub, because the latter was too rough on the shoulders of the horses. In the discussion that followed, Mr. H. Simmons preferred rolling in September, because that gave the horses a longer spell before harvest than was the case if it was left until later in the season. He did not favor rolling the scrub after harvest, because the shoots did not get a sufficient check. He preferred the roller to the log. Mr. C. Masters said scrub should be rolled before harvest, because that allowed the shoots to make a start, and the fire burning them then gave them more of a check. In dealing with shooty scrub he favored a roller with a log attached behind, but in larger scrub he preferred the roller alone, because the log was inclined to drag the scrub into heaps, which spoilt it for burning. Mr. G. Smith thought the heavier the roller used the better, because a heavy roller did not leave so many snags as a light one. He preferred a log for dealing with burnt scrub. Mr. C. Simmons favored rolling early. In fairly heavy timber he preferred a log with a top rail, because it did a better job than a roller, and very often pulled the stump out with the tree. Mr. B. Evans favored a heavy roller. He thought the earlier the scrub was rolled the better. Cutting the spring-backs ensured a better burn. Mr. M. Masters preferred rolling scrub before harvest, because it caused a greater check to the shoots, but he did not think fallowing should be neglected to enable the scrub to be rolled. He favored a heavy roller. A log was the best for dealing with shoots and where it was not possible to secure a running fire.

TALIA.

July 14th.—Present: 10 members and visitors.

FUMIGATING RABBITS.—In the course of a short paper dealing with this subject Mr. M. Boylan expressed the opinion that rabbits were the worst pest that farmers had to deal with in that district, and for that reason he considered it the duty of every landholder to use every effort to keep the pest in check. He had used strychnine baits, the poison cart, and the fumigator, and he was convinced that the last mentioned was the most effective means of dealing with the rabbits. He held the opinion that two fumigations to every set of burrows were sufficient to destroy all the rabbits, whereas the poison cart would only destroy a certain percentage at special periods of the year, neither could the poison cart be used in very stony country. The fumigator could be comfortably worked by two men, one man pumping the fumes into the warren whilst the other filled in the holes from which the gas was escaping. Care should be taken that every hole leading into the warren was treated. It was a good plan to hunt all the rabbits into the burrows before using the fumigator, or those that were left outside would open the holes, and so reduce the effect of the gas.

YADNARIE (Average annual rainfall, 14.09in.).

July 24th.—Present: 10 members and visitors.

FALLOWING.—Mr. H. Weiss, who read a short paper dealing with this subject, said fallowing was one of the most important operations in connection with the working of the farm, and the job should be started immediately after the completion of seeding. For their district he favored working the plough at a depth of 2in. to 2½in. on sandy soil, but the heavy land could be worked to a depth of

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from 3in. to 4in. The plough should be correctly adjusted in order that good work would be performed and to ligh[illegible] Sandy land should be worked when it was wet, so that it would be left in a rough condition to reduce the danger of drift to a minimum. A cultivator was the best implement for working clean fallow, but where a heavy growth of weeds had to be turned under, he thought a twin plough should be used. The fallow should be worked during September, so that as many stumps as possible would be pulled out. Before the commencement of harvest, all stumps and bushes should be carted off the land. If summer rains fell the fallow should be cultivated, but he did not think it advisable to use harrows because they had a tendency to make the surface soil too fine, which would probably result in drift. Mr. O. Forbes, who opened the discussion, referred to the good work that a flock of sheep performed on the fallow land. Where new land was being brought under the plough, two crops of wheat should be grown in succession, the land then fallowed to a shallow depth with a cultivator, sown with wheat, and then one crop of oats. He favored a spring draught plough, but care should be taken to adjust the implement so that each furrow worked at the same depth and turned over the same width of land. The farmer should study the nature of the soil that was being cultivated and work the plough accordingly. Mr. A. Sprigg and Mr. A. Jericho both thought that new land should not be ploughed too deeply. The depth of ploughing could be increased as the land received subsequent cultivations.

CUNGENA, July 28th.—The inaugural meeting of the above Branch was held in the local hall. Fifteen members and 16 visitors attended the meeting. Included amongst the latter was the Manager of the Minnipa Experimental Farm (Mr. R. Hill), who delivered a short address, "The Work of the Agricultural Bureau." Mr. Hill also read a paper, "The Wheat Plant from Germination to Maturity," and an interesting discussion followed.

EDILLILIE, June 12th.—All members were present to listen to an address, "The Wool Industry," which was given by the Wool Instructor of the School of Mines (Mr. A. H. Codrington). On the occasion of the annual meeting, which was held on July 28th, the Hon. Secretary (Mr. J. F. Carter) presented the annual report, and the officers were elected for the ensuing year.

KOPPIO, July 23rd.—The Hon. Secretary (Mr. T. R. Gardner) read an article, "Breeding Merino Sheep," which aroused a keen discussion. The matter of the increase in the freight and fares between Port Adelaide and West Coast ports was also brought before the meeting. The delegates to the Annual Congress were appointed, and the officers were elected for the ensuing year.

LIPSON, July 28th.—Mr. W. Brown read an article, "The Tractor *v.* Horses," and a keen discussion followed. Mr. S. Swaffer contributed a paper, "Fallowing," and all members present took part in the interesting discussion which followed. A paper dealing with the subject "Can Country Life be Made More Attractive?" was read by Mr. E. J. Barraud. The Hon. Secretary (Mr. W. R. Blacker) also read a short paper, "Alternate Cropping."

McLACHLAN, August 4th.—Matters in connection with the forthcoming Conference of Eyre Peninsula Branches, to be held at the Government Experimental Farm at Minnipa on September 27th and 28th, were brought before the meeting. Several other items were also introduced, and an interesting discussion ensued.

MILTALIE, July 28th.—An interesting paper dealing with the subject "Progress of Agricultural Machinery and Implements" was read by Mr. D. P. Bagnell, and a keen discussion followed. The annual report of the work performed by the Branch during the past year was presented by the Hon. Secretary (Mr. W. G. Smith), and the officers were elected for the current year.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

July 28th.—Present: 17 members.

TRACTOR *v.* HORSES.—The Hon. Secretary (Mr. C. F. Altmann) read the following paper:—"To ascertain the cost of ploughing with a tractor, compared to horses, I have taken a paddock of 74 acres, which I have just finished fallowing. To do this job took me actually 7¼ days, averaging 10½ acres per day. Costs:—96galls. kerosine, £7 11s.; oil, 5galls., £1 11s.; petrol, 1gall., 2s. 5d.; grease, 8lbs., 6s. 8d.; total, £9 11s. 1d. Loss of time through other work and weather, 3½ days. To plough the same paddock with horses, using the same implement and an 8-horseteam, which could not do more than 6 acres a day, because the soil is very heavy and far above the average of this district, would mean 12 actual working days, in addition to loss of time, which I will put down as the same as with the tractor. My calculations are:—Feed, 2½ weeks at 1 ton of chaff per week at the present price of about £4 10s. per ton, would be £11 5s.; wages, for a man for 4½ days at 10s. per day, £2 5s.; total, £13 10s.—showing £3 18s. 11d. in favor of the tractor. This is for fallowing where no loss is incurred through delay.

PINNAROO (Average annual rainfall, 16.74in.).

July 26th.—Present: six members and visitors.

MANAGEMENT OF SHEEP ON THE FARM.—Mr. M. S. Davis read a paper dealing with this subject, and in the course of the discussion that followed Mr. P. J. Edwards considered that a practical demonstration in woolclassing was far preferable to a lecture or whatever one might gain from the reading of books. He did not advocate leaving too much "tail" on lambs as a preventive against the blowfly pest at a later date. Mr. H. J. Fewings did not favor making too many classes of wool in the classing of the clip. Mr. J. Scales did not favor allowing the sheep to roam over the fallow when going to feed and water, so that the fallow would not be made too fine, and then be more liable to drift. Mr. P. H. Jones favored placing the rams with the flock about October, so that the ewes would lamb in warm weather, and have the benefit of early green feed.

RAMCO.

May 28th.—Present: 15 members and visitors.

Mr. J. Jemieson read a paper, "Companies," and an interesting discussion followed. Mr. F. Lewis introduced the matter of holding homestead meetings and said at the ordinary meetings of the Branch members discussed various subjects in connection with the management of the orchard, but if a meeting was held at the homestead of one of the members, the visitors would have the opportunity of

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inspecting the horticultural practices that were adopted. The best time he thought to hold such a meeting would be during October or November, because at that time the crops had "set" and would show the results of the blocker's work. Mr. O. B. Boehm was of the opinion that it would be better to hold a meeting of inspection after the pruning had been completed. After several other members had supported the suggestion, it was decided that the Branch should hold a homestead meeting during November. Members also discussed the question of top dressing lucerne plots and the grafting of sultanas on to Gordo stocks.

RAMCO.

July 23rd.—Present: 10 members and visitors.

ORCHARD WORK.—Under the title "Hints for the Year's Work on the Block" Mr. C. Boehm said he commenced pruning immediately the leaves had fallen. Peaches and nectarines were generally the first to shed their leaves, and, as a rule, he had some of those trees pruned during May. He considered pruning to be one of the most important jobs on the horticultural block. The next work was raking out the cuttings, which he usually performed with a mallee stick or rail about 8ft. or 9ft. in length, to which a double wire was attached 3ft. from one end. The short end of the stick should have a bevel on the lower side to prevent it from digging into the ground. Next the land was ploughed—off or away from the rows—the last round or two being done with the horse hoe. After four to six weeks had elapsed he again worked the hoe to cover the roots of the trees thoroughly, finishing up with the furrow in the centre between the rows. After the completion of that work time could be devoted to odd jobs about the block, carting firewood, repairs to the drying plant, and the making of new picking buckets. When drying was completed all the trays should be washed, and any broken ones should be repaired and stacked. The trays could be washed by spreading them out on the racks and allowing the rain to do the work, but when 3ft. by 2ft. were used it was a good plan to use the dip, into which 20galls. of water and 1lb. of caustic soda had been placed. The solution should be boiled and the trays immersed, first one end and then the other. The speaker always made a practice of rolling up the hessians directly they were cleared of dried fruit, and when the "sweats" had been emptied, a few of the best could be picked out and the hessians stacked away in a place safe from the attacks of mice. The buckets should also be dipped at the end of the season and placed on the rack upside down, where they would be found in a clean condition for the next season's work. Mr. G. Lewis mentioned that he had successfully raked out the cuttings from between the rows with a set of harrows. Mr. J. Boehm considered that the later pruning of peaches ensured a better crop for the ensuing season. Mr. W. Green thought it best to stack the trays, but not to wash them before the commencement of the new season.

TAPLAN.

July 12th.—Present: nine members.

BREAKING IN AND CARE OF YOUNG DRAUGHT HORSES.—The following paper was read by Mr. D. Chancellor:—"When the farmer intends to break in a young horse he should provide a good, strong yard in which to catch the animal. The posts, which must be at least 3ft. in the ground and 6ft. above it, must consist, if the yard is to be a strong one, of stout and solid material. Strong rails should be bolted to the posts about 18in. apart, and in the middle of the yard an equally strong post should be fixed some considerable depth in the ground for tying up the horse. Care should be taken that the rail is free from protruding, and consequently, dangerous spikes; also that the end of the rails protrude outside the yard; and if the rails are fastened by wire instead of bolts, particular care must be taken to keep the ends of the wire outside the yard. If these matters are not attended to, they may result in serious consequences to a young horse frightened during the breaking-in process. In order that the horse may not be tempted to jump the enclosure, the rails should be continued to the top of the posts. It is also important to keep the structure of the yard free from barb wire, because it is a danger to the horse and an inconvenience to the man. Various methods of catching a young horse are in use. A very good method is

the crush pen, where the horse is brought into such a position as to enable a person to get around it and handle it with safety. Some people believe in using the whip to make a young horse come up or turn its head towards them to enable them to catch it. Personally I condemn this method, being of the opinion that the less a person uses the whip the more the horse realises that one does not wish to hurt it. The whip is sure to frighten it, therefore making it hard to catch. My idea is to have a long stick, a stout, fair length of rope with a ring at one end. Make a sling in the rope and put the ring on the end of the rope and approach the horse, bearing in mind that the horse is young and timid and does not know what you are going to do with it. Let the stick and sling rest on the animal's back for a little while and speak to the horse, gradually working down until the ears are reached; then gently rub the stick backwards and forwards and gradually work down until the rope is in a suitable position. Then take the stick away, taking care to put it where it will not hinder the feet of the person breaking in the horse. It is a good plan to give the horse a name at the beginning of handling and stick to the name, then the horse will soon know it. Once the rope is on the horse approach the animal and rub it about the head, ears, and between the eyes. If, however, after a few tries the horse will not allow this to be done, put the rope around the post and make the horse go towards the post, taking up the slack rope at the same time. In all probability the horse will hang back. If it does, let it have a good pull, it will do it good. Should it choke, slacken the rope immediately and the horse will soon give up hanging back. Take a pair of winkers, undo the bit, try and put the winkers on in the ordinary way. If, however, the horse will not allow this to be done slip them over the ears. Care should be taken to see that the winkers are thoroughly oiled beforehand, so as to make them pliable, as the winkers will have to be adjusted to fit the horse when they are on, and one should not be troubled with stiff leather, buckles, or keepers. When the winkers are on the horse, a rope should be put on the bit ring; then take the rope off the neck. The horse should be made to run around the yard; a good tension should be kept on the rope. Should, however, the horse be too hard to hold, then undo the rope off the bit ring and run it through the ring under the jaws and fasten to the other side bit ring. This will enable one to hold the animal with ease. When you think the horse has had enough of that side put the rope on the other bit ring and give the horse a run around on that side. For draught horses I do not think very much mouthing is required—leading is more essential than mouthing. One man should lead the colt while another is behind helping it along. Care should be taken not to jerk the horse's mouth or hit it about the head, because such abuse is not easily forgotten by the animal. Take a collar and see that it is a perfect fit for the horse—for preference, a leather-lined pipe collar. Soak the collar over night in water, then put it on the horse while wet and it will be pulled into the shape of the horse's shoulders. Also see that the hames are a good fit, and see that the draught is in the right place, otherwise the horse will get sore shoulders quickly. Alteration of draught will permit the driver to cure a sore on the shoulder. When the collar is dry give it a good oiling with neatsfoot oil, also the hame strap. Then keep that set of hames for the horse, because it is a bad policy to change the harness The best place in an 'abreast' team for a young horse is next to the rein horse. This position enables the driver to have more control over it by the use of the cross rein. In a tandem team the youngster should be put either near side or off side behind. This enables the driver to get to the horse quickly. In an abreast team put a good, stout rope around the youngster's neck and tie it to the chain of the horses on each side. Care should be taken to put the rope just behind the hame hooks, seeing that it does not affect the horses by rubbing. In a tandem, if an iron spreader is used in the leader's chains, tie the rope around the spreader. If a wooden spreader is used, tie the rope on to the leader's outside chain, just where the spreader is put in. Do not tie it around the spreader, because, if the horse should hang back, the wood is not strong enough and will break. The driver should examine the chains and see that they are the same length. Do not tie knots in the chains. Should the chains rub the animal, a piece of sheepskin or bag should be wrapped around and tied on the chain where it is doing the damage. The young horse should not be worked more than half a day at a time until it becomes hardened to the work. Particular attention should be paid to the collar and shoulders. The driver should scrape all sweat

off the collar and clean the shoulders thoroughly, when 'yoking up,' with a curry comb and a good, stiff dandy brush. The first two or three times the young horse is put in, the driver should spell the team often and occasionally go and ease the collar off the shoulders of the young one. By doing this the danger of scalding is greatly reduced. When 'yoking up' see that the fringe is removed from the forehead band and the mane from under the collar. Should the mane be matted, knotted, or tangled, and likely to get under the collar, cut it off, or it will injure the horse's shoulder. At night, when the horses are unyoked, wash the shoulders with cold water. This hardens the skin and assists in preventing sore shoulders. However, should the horse get sore shoulders, the driver must pay attention to the collar and draught of the hames. All blood, skin, &c., must be cleaned off the collar, and with a leather-lined collar use a wooden mallet for knocking the place which fits on the sore. Care should be taken to have the mallet rounded off, because the edges of a flat-faced mallet are liable to break the lining. Also keep the lining well oiled. With a check-lined collar, the stuffing should be eased away from the place. This can be done with the aid of a large chaff bag needle. By doing this you make a hollow over the sore, and a pad around the sore. Smear this part of the collar with a little grease to prevent the sweat and discharge from the sore entering the lining and making it hard. Do not cut the lining to take out the stuffing. This method not only damages the collar, but also allows the stuffing to come into contact with the sore, and the sore does not heal so quickly. When the collar and hames are removed at night from the horse, wash the sore with cold water and salt. Also remove any hanging skin and scales, because these come off more easily while the sore is hot, and if left on over night they get hard and are not easily removed. If they are left on they will hurt the horse, perhaps making it pull sideways when work is started. Over Sunday, or any day when the horse is not working, smear the sore with grease to keep the flies away and prevent a hard scale from forming. Should the horse be spelled for a time on account of its sore shoulders, give the sores a dressing every day with a good healing ointment. The driver should see that the youngster is given a good drink on each occasion it is let go for this purpose, and it should be shut away and fed by itself, so that the other workers cannot hunt it away from the feed. When working, it should be fed four times a day—morning, noon, teatime, and before retiring to bed. On the first three occasions give it what it can eat and no more, but give it a good feed at bedtime. Do not put fresh chaff in the manger on top of a lot of stale chaff. It is better to take the stale chaff out and feed it when the horse is spelling. The winkers should be removed every night, because winkers left on any length of time are liable to chafe the horse's head, especially behind the ears. Before taking the winkers off, tie a piece of light rope around the neck and let one end hang about 2ft. Be sure to tie a knot in the end of the piece left hanging to prevent it unravelling. The rope will come in handy when catching the horse again. Should the animal refuse to let you catch it by walking up to it, get a stick, put a wire hook on it and catch the rope with it. Once the horse feels the strain on its neck it realises that it is caught and will allow you to go up to it. After the horse has been at work for a while and gets to know what is being done it may get cunning and refuse to let you catch it. Then the use of the whip is quite justified. Give the horse a few sharp cuts across the rear and let it know that you are the master and time for play is finished. Do not chase the horse around the yard throwing the winkers after it. It is a bad habit and a waste of time. Also do not give it a hiding after it has been caught. Should its mouth become sore it will be inclined to throw up its head. This can be prevented to a large extent by putting the couplings on the winker rings and not on the bit rings. Should a driver have a lazy horse in the team and want to touch it up, use a stone for the purpose. This will hit the lazy horse and not flurry the youngster. The whip makes too much noise, and a clod of dirt is liable to break and scatter, hitting other horses, perhaps the youngster. One must always bear in mind, when handling a young horse, that patience is an excellent help. I do not agree with the idea of putting the young horse between two old workers and hitching to a log, because two of the best horses are always taken for the job, resulting in a lot of fooling around when they have any amount of important jobs to do about the farm without assisting to break in a youngster. Put the young horse straight to work. A

young horse should not be under three years of age when broken in; for preference four years old is a better age, because the horse is better able to withstand the work when it becomes aged."

WILKAWATT (Average annual rainfall, 16in. to 17in.).

July 21st.—Present: seven members.

FALLOWING.—Mr. E. W. Brooker, who read a short paper dealing with this subject, said fallowing should be commenced as early as possible after seeding was finished and should be completed by the end of August. Although opinions differed as to what depth the land should be ploughed, he preferred shallow ploughing, *i.e.*, to a depth of about 1½in. When the ploughing was finished and the stumps removed, the land should be harrowed across the ploughing. In the subsequent working of the fallow one should act according to weather conditions, because the rain formed a smooth surface on the land, which necessitated light and continued cultivation until the surface was in the condition of dust. In the discussion that followed, Mr. F. Koch favored ploughing to a depth of 2½in. to 3in. so that the plough would not jump out of the ground when passing over stumps. Members did not consider it advisable to work the land down too finely in that district, because of the danger of drift. If possible the last cultivation should be made during the spring, crossways to the prevailing winds.

CARE OF HORSES.—Mr. A. G. Ellis read the following paper:—"While horses are working they should be stable fed and kept off green feed. Some favor turning horses out and working them on paddock feed, but in my experiences the stable fed horse will outwork the others. The stables should be cleaned out frequently, because stable refuse encourages germs that are detrimental to the good health of the horses. I favor wooden mangers, because they are warmer in winter and cooler in summer. The iron mangers, during winter months, are very moist, and food, when fed under these conditions, is harmful to the horse. Forty pounds of fodder a day is a good ration for a horse. It should be divided into four feeds of 10lbs. each. It is a mistake to allow the horses to constantly have their heads in the manger feding while in the stable. Forty pounds per day is quite sufficient to keep a hard working horse in good heart. An hour and a half should be allowed for the mid-day meal. For the night feed long hay, fed in a separate manger from the chaff, is a good feed. The best preventive of sore shoulders is to have well fitting collars All horses should work in back bands, and the back bands be fitted so as to ensure a square pull on the shoulders. In the case of horses getting sore shoulders, every care of the animals should be taken by the teamster. He should wash the shoulders well in cold water and keep the part of the collar covering the sore well scraped and clean. A sore that is kept clean will heal more quickly than one that is neglected. It is also a good plan to work a folded bag under the collar when the shoulders are sore. Grooming is absolutely essential, and should be done daily, in the mornings for preference, because the sweat of the day before is then thoroughly dry, and brushes out easily. A good stiff brush should be kept for brushing the lining of the collars prior to putting the horse to work for the day. Particular care should be taken in driving the team, and a mistake is often made of asking four horses to do the work of five. When arranging the team the weight should be as evenly distributed as possible, and the teamster should endeavor to avoid, as much as possible, working a small horse on the same swing as a heavy one. Every horse should be allowed plenty of room in which to work. A mistake is often made of using narrow spreaders. Sixteen inches or 17in. to the horse on the main spreader is required. It is also a good plan when working brood mares in foal to have the swing on which they have to work a little wider than under ordinary circumstances so that there is no danger of chains rubbing. Mares should be worked till within three or four days of foaling, for I invariably find that they are the better for this exercise. Of course, do not give them very heavy work. Horses should be watered before meals and the trough shut off from the main stable yard. Horses that can get water whilst feeding do not digest their food so well as when watered before feeding. The trough should be cleaned out at frequent intervals, because if left too long, it deprives the horses of fresh water, which is essential to ensure good health. Horses should have two spells during the year; one in the spring and one after the

harvest. When turned out they should be watched, especially after harvest, to see that they do not become affected with sand. Some farmers drill in paddocks for horse feed in this district. I should refrain from doing that, because there is plenty of natural feed, and the natural spring feed is better for stock. If the practice of drilling paddocks for feed is carried out, I favor barley in preference to oats, because oats, when green, are bitter, and horses when feeding on oats will often drink more water than is good for them."

BARMERA, July 12th.—To an attendance of 70 members and visitors the Deputy Horticultural Instructor and Manager of the Berri Experimental Orchard (Mr. C. G. Savage) gave a pruning demonstration on Mr. Cockshell's block. At a further meeting held on July 30th Mr. W. E. Ellenby gave an address, "The Feeding and Care of Poultry." The Hon. Secretary (Mr. D. H. Brooke) presented the annual report, and the officers were elected for the ensuing year.

BLOCK E, July 24th.—Mr. F. J. Olorenshaw, a member of the Renmark Branch, attended the meeting and read a paper, "Horsework," which was followed by a lengthy an interesting discussion. The annual report of the work performed by the Branch was presented by the Hon. Secretary (Mr. C. L. Ashenden), and the officers were elected for the ensuing term.

GERANIUM, July 26th.—Mr. W. Pannell read an article, "The Preparation of Fallow." The Branch decided to hold a crop growing competition during the ensuing year.

MYRLA, July 21st.—Several subjects of local importance were brought before the meeting for discussion. The delegates to the forthcoming Annual Congress were appointed. It was decided that future meetings of the Branch should be held on September 22nd and October 20th.

POMPOOTA, August 1st.—Mr. A. Lambert read a paper, "Pig Raising," and an interesting discussion followed. A further meeting was held on August 15th. Mr. E. Leishmann (Orchard Instructor and Inspector) attended and delivered an address, "How to Prune a Pear Tree."

WINKIE, July 26th.—Twenty-two members of the Winkie Branch paid a visit to the Government Experimental Orchard and, under the guidance of the Manager (Mr. C. G. Savage), inspected the various horticultural experiments that are being carried out.

YOUNGHUSBAND, July 27th.—A paper dealing with the subject "Gardening" was contributed by Mr. J. Gowling, and an interesting discussion followed. Members also discussed the question of Cotton Growing along the River Murray.

SOUTH AND HILLS DISTRICT.

CHERRY GARDENS (Average annual rainfall, 35.03in.).

July 24th.—Present: 14 members.

ROAD MAKING IN THE HILLS.—Mr. C. Ricks read a paper dealing with this subject, in the course of which he said one of the most serious questions that the producers had to face was that of getting produce to the market. The roads in many places were in a worse state of repair than they were 25 years ago. He was of the opinion that it had been false economy to starve the roads, because once they got into a state of disrepair water lodged in the holes, and these soon made larger by the traffic. The new road, the speaker said, should not be less than 18ft. wide. In laying out the road the centre of the road should be marked, and a plough worked both ways to form the crown. The crown of the road should not be less than 12in. higher than the outside. After the road had been rolled the centre would be reduced to a height of 8in., which would give a good fall for the water. Next an 8in. coat of 2in. metal should be applied, and the road well rolled and dressed with 1in. of good blinding material. New roads should be made in the early spring, so that they would have a chance to settle down during the summer. When roads were being made through swampy or sandy soils it was sometimes difficult to get a good, firm bed for the metal.

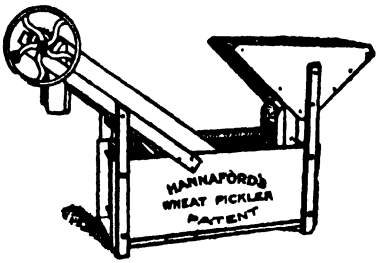
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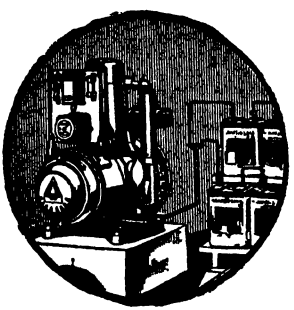


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In those places it was a good plan to place a 6in. layer of ti-tree, furze, or broom bush in the bed of the road to prevent the metal from being pushed down into the sand. Keeping the roads in repair was a most difficult matter in the Hills on account of the tendency for roads to wash out with the heavy rains. He believed that the present system of maintaining the roads was at fault. The work of the district councils should be confined to district roads. The system he advocated was that one man should have the care of six miles of main roads. It should be his duty to keep the watertables clean, keep the roads clear of loose stones in the summer, and put blinding on patches of stones that were often pulled up during the dry weather. The man would also be required to help put out the metal in the winter.

CURRENCY CREEK.

July 6th.—Present: 13 members.

QUESTION BOX.—The meeting took the form of a "Question Box." Several items of local interest were brought forward for discussion. In reply to a question "Will Cultivation Kill Subterranean Clover?" members were of the opinion that intense cultivation would be detrimental to the plants. It was generally agreed that the best plan to adopt to set a broody hen was to place a straw-lined box, with a lid, on the ground. Members considered that working horses kept in better condition when fed on chaff than when fed on long hay. It was thought that oaten hay made better chaff than sheaves cut from the wheat crop. In dealing with the question of the best ram to use on Shropshire ewes for the purpose of breeding a lamb suitable for the export trade, members favored the Merino. It was generally contended that whole barley should be crushed before being fed to pigs.

FARMING AS A BUSINESS.—At a meeting held on July 26th a paper dealing with this subject was presented by Mr. G. W. Ritchie. He said:—While I deal with farm management, I wish more particularly to refer to the "Business of Farming," because a farm cannot be managed successfully unless the farmer is a keen business man. Farming is as much a business as any other of the professions or trades, in fact, in my opinion, the business of farming is far more complex in character than many other professions. There are so many varied conditions that the man on the land has to contend with that a farmer, in the days of power farming, &c., needs to be a specialist, as it were, in his own line of business. Before I continue further with the subject of management, I would like to ask the question, what qualities go to make a successful business man? because hereon the whole management of the farm hinges. In my opinion one of the greatest assets for a business man to possess is "personality." No matter what the concern may be, or how large or small, it is always the expression of personal force, just as the personal force of a nation is the sum total of the personal force of its people. Without a doubt men, not money, are the determining factors in all commercial and industrial undertakings. Another point, and a very necessary one, a business man must possess plenty of energy. A man who wishes to forge ahead must work, he must be energetic. Energy has developed continents, created industries, built up large business concerns, and made the powers of men. Harness your energy with common sense and guide it with system. Here is another dominant factor, which must prevail if a farmer hopes to be successful, it is system. I do not think there is any phase of a farming business that does not require system. A good motto should be system, system some of the time, and system all the time. Nothing must be left to chance or to take its own course; it is no good being like Micawber and wait for something to turn up, because with farming the only things that seem to turn up while you wait are weeds, and plenty of them. To be thorough and effective in any business proposition, a system must be followed and very closely adhered to. In every walk of life we find that the man, who is methodical and systematical in all his undertakings, is the one to whom success is not far distant. A good ship does not necessarily guarantee a safe port, nor does a good system alone ensure a successful business. Concentration is another very important feature connected with good business. Do not allow anything to pass half finished, but devote all your energy and concentrate your mind upon it and see for yourself that the work is complete. A prominent British financier once said, "Focus your ability on one point until you burn a hole in it." Some men never get up until they are

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called; if no one happens to apply the stimulus they are gunpowder without the spark, dough without the yeast, or an engine without the steam. No alarm clock is going to strike the hour of our opportunity. Fate never yet failed to turn down the man who waited for something to turn up. The foregoing, while dealing in a general way with a business man, and the qualities essential thereto, are applicable to the business of farming, because, as I have previously stated, farming is quite as much a business as any other trade or calling may be. I have known business men to fail as farmers, but that is not proof that business acumen is not essential to success on the land. In fact, I think keen business ability is needed more in farming than in any other concern, because most trades are so thoroughly organised that a price can be fixed for an article based upon the cost of production, while the farmer has to abide by the ruling rates in the market. Here again, system is required; on a farm that is managed systematically and has a good business man in control, all the work must go along smoothly without any overlapping. To make a success of the business of farming the farmer must be fully alive to all the scientific aids to agriculture. Research work is conducted on all Government Experimental Farms solely to assist the man on the land, and the individual who allows advantages like these to go by the board is not conducting his holding on correct business lines. It is absolutely essential that a correct method of bookkeeping should be followed on the farm, there are several books on the market at present which will assist the farmer in this direction. Constant scrutiny of the various operations will quickly show where improvements are possible. It is not possible for any business to be conducted satisfactorily unless complete records are kept, and it is here again that a good system of keeping accounts is necessary. Of course, we know the old adage that "Experience is a great teacher." Quite so, but there are many men to whom the lesson does not appeal; they are content to just muddle along and consequently do not get the best out of the land by supporting every progressive movement and being alive to the possibilities of their holdings. They can increase the production and enhance the value of the property. There is one point I would like to touch upon at this stage, and that is the proper care of machinery and implements on the farm. We do not find a good business man neglecting the machinery with which he operates his concern, but how often do we see valuable farming implements left to the tender mercies of the weather; machinery neglected in this manner means a loss that can be avoided, and should be avoided. The depreciation on farm implements is quite enough in the ordinary course of operation without any loss. A farmer to be successful from a business standpoint must study the cost of production in every direction; he can turn to his records of sales, &c., and then turn to the cost of production; the margin representing profit must always be the factor for the man on the land to keep in view. Competition is another feature that every business man may be alive to. Certainly there is not one business where there is not competition; it is opposition that in these days when power farming is gradually gaining a foothold, it behoves the farmer to study the cost of production and to ascertain the cheapest possible methods by which to conduct his business. Of course, we recognise the producer has at his disposal the markets of the world, but, there again, in one country the cost of production may be far below another. Here time-saving and labor-saving machinery is going to be not only a convenience, but an absolute necessity if the farmer means to run his farm on business lines. Consequently, if the farmer wishes to apply correct business methods and shrewd management to his property, he must be fully alive to all the emergencies relating thereto. There is an old saying, "Nothing succeeds like success." Well, it is only with the application of a good system, based on sound business management in relation to the business of farming, that any man can hope to succeed.

CYGNET RIVER.

DAIRYING AND BUTTER MAKING.—The following paper was read by Mr. L. H. Moar:—The principles of butter making are easily understood. When studied from the standpoint of present knowledge, most of the mystery that formerly surrounded the work of the butter maker disappears. The making of good butter is not a system of "rule of thumb," but certain well defined rules can be laid down, which, if followed, will ensure success. On the farm, the maker has control of every step in the process of making butter. Beginning with the supposition that cows are normal and healthy, he starts with one ideal condition, namely,

a source of pure milk. As the milk is drawn from the udder it should be free from any element which would cause its decomposition, but the fact that it will in a few hours become sour or show evidence that other changes have taken place proves that a foreign element is present to produce these changes. A study of these changes and their cause is the first and most important lesson for the milkman and butter maker. Everyone is familiar with the changes that often take place in milk, and those which occur in the spoiling of fresh meats and vegetables, though the causes that produce these changes may not be apparent to the observer. It is also a matter of common experience that in hot, moist weather, these changes take place with greater rapidity than in cold or dry weather. Everyone who has handled milk has learned that cleanliness in everything that comes in contact with it is one of the essential factors to success. Cold storage, such as may be supplied by the common household refrigerator or cooler, is also necessary for the keeping of milk and other perishable products in hot weather. The cause of the spoiling of fruit, vegetables, meats, and milk was discovered by Pasteur, to be bacteria. He found that these minute forms of life, so small that it takes a very powerful magnifying glass to see them, were the cause of all decomposition. A study of their life, habits of growth, the food on which they lived, the kind of substance on which they could develop, and the temperatures most favorable to their growth, revealed the scientific necessity for observing perfect cleanliness in all dairy utensils and for keeping the milk cold. It was found that bacterial life is in existence everywhere, and only awaits the proper food, moisture and warmth to cause the bacteria to multiply very rapidly. Just as a grain of corn grows when given proper moisture and warmth, so the germ life that finds its way into milk utilises the food and warmth found there to grow and multiply, causing decomposition. It has been found that when milk or other perishable foods are kept free from bacteria they will not spoil, and, further, that foods of this nature, when kept at low temperatures, are very much longer in spoiling, although they may contain large numbers of germs. When milk and other products are heated to a high temperature the bacterial life is destroyed, and the products will keep for a long time if no additional bacteria gain access to them. In all large modern factories there is a machine, known as the pasteuriser, which is a very large vat with a revolving worm inside, through which a stream of hot water, about 130deg., runs for about 20 minutes. Too many milkers regard the work of milking as a dirty and disagreeable task. The work has resolved itself into nothing more than the manipulation of the udder, and is to be hurried through as quickly as possible. The element that takes from all drudgery its unpleasantness is wanting. That element is thinking along lines tending to improve the work. In the process that attends the milking of the cow there is enough to cause the milker to study seriously the work that leads to the making of a perfect pound of butter. Milk as it is drawn from the udder is nearly free from bacteria. Could it be kept in this condition, it would keep for many hours before any perceptible change would take place. The first bacteria enter during the time of milking, and are naturally from the cow and her surroundings. The manipulation of the udder works off hairs, particles of skin, and many instances, particles of manure that adhere to the hair and udder. All of this material finds its way into the milk pail, and carries with it great numbers of bacteria. The warm temperature and the presence of congenial food supply that is in just the right physical condition cause these bacteria to multiply very rapidly, and unless something is done to check their growth, souring or other evidence of decomposition will take place in a few hours. The rapidity with which these changes occur will depend almost entirely upon the temperature at which the milk is allowed to stand, and the number of bacteria that find entrance to it. These facts are constantly in the mind of a careful dairyman. He knows that the first step is that of prevention. The work of milking should be performed in such a way that few bacteria will find their way into the milk. The milk should be cooled quickly and thoroughly immediately after it is drawn, in order to check the growth of bacteria that will, under the best of conditions, find their way into it. All this leads to the conclusion that the cow must be carefully cleaned. This is as good for her physical well-being as for the protection and purity of milk. The udder should be thoroughly washed with clean water so as to remove most of the dust, and what remains is less likely to fall into the milk bucket. If the milking is done in a shed, as it usually is when a fair number of cows are milked, there are

several points which need attention. The air must be pure and free from dust, the floors must be such that they may be washed and swept with ease (it is a common plan to have a small elevated tank at the cow shed and a length of hose for flushing the floors, which are usually of either bricks or cement, and sometimes slabs are used, but they are not the best). The hands of a milker should be rinsed between the milking of each cow. Some dairymen, especially those whose milk is taken by the condensing factories, insist on their employees wearing scrupulously clean, white goves, whether milking by hands or machine, and their sheds are constantly under the whitewash brush. A whitewashed building shows up any dirt or cobwebs to their disadvantage. A shed is usually built facing the east, so as to have the pure, cleansing rays of the morning sun, and the floor, as mentioned before, should be of brick or concrete, and slightly sloping outwards, but the grade must not be too sharp, because it is very slippery when wet, and many a good cow has been ruined through slipping and straining herself. If cows are to be fed whilst milking, ample depth must be given in the construction of the shed. Feeding, during the milking, was highly condemned up till a year or two ago, but now it is practised on all fair-sized dairies, especially if the machines are in use. One more word in regard to the milker before I pass on. If anyone is a little hasty tempered, the best thing is to leave dairying alone. A really good cow is nothing more than a bundle of very highly-sensitised nerves, and as some people are termed thin-skinned and easily offended, so is the good cow. She must be gently and carefully handled, and, above all, a few rowdy boys are the worst things on a dairy farm. Cows must be milked regularly. Dehorning is now being practised on most dairy farms. The dehorner costs about £4 10s., and if subscribed to by several members the price to each comes comparatively low (my share was 14s., and I had over 50 head of stock done, whereas the local veterinary surgeon used to charge 2s. per head. The proper washing of milk utensils is something which is often misunderstood. All milk should be rinsed from the surface of a vessel with either cold or lukewarm water before coming in contact with hot water, because the heat will cook the milk on to the surface, forming a coating very difficult to remove. If this coating is not removed it furnishes food and place for bacterial growth. This is especially true around places liable to remain moist. After rinsing the vessel free from milk, it may then be washed in hot water and scalded or steamed. There should be added to the water some good cleansing compound; some of the so-called washing powders are very objectionable, because grease of some kind is used principally in their composition. When such powders are used, a coating of thick grease will be formed around the edges of the washing pan containing the water. Powders can be procured that are guaranteed to contain no grease, and usually they are excellent cleansers. Washing soda is frequently used. In scrubbing the surfaces of milk vessels, a good brush should be used; it costs little, and will get into corners fairly effectively. Another point: the final rinsing of dairy vessels should be in thoroughly boiling water or, better still, steam. There is a very effective steamer on the market, procurable for about £4. With a couple of handfuls of eucalyptus leaves you can have steam inside three minutes; that seems incredible, nevertheless a fact. It is all the better if the articles remain in the boiling water or steam for a few minutes, so that the heat may penetrate completely through the tinware, the heat killing all bacterial life. After boiling or steaming, the surface dries very rapidly, and should be allowed to do so naturally. Turn the vessel so as to drain, and in a few moments the heat of the metal will dry the surfaces. A cloth is generally used for drying, but that usually undoes the work of scalding to a large extent unless a very clean cloth is used each day. It is a good plan to stand utensils out in the sun so that the rays may penetrate inside of them. Most species of bacteria cannot live in the direct rays of the sun, and for this reason sheds and milk rooms, except cold storage, should be built so as to allow any abundance of sunlight to enter. Milk is often spoiled by allowing it to stand too long in the bails before taken to the milk room. It should be immediately removed to a place free from odors. If milk is placed in a cellar where there are decaying vegetables or fruits, their odors will soon be acquired by it. The room should be built to allow for ventilation. Cooling arrangements must be made in summer time, if only to stand the cans in a tank or vats of water. In carrying cream to the factory in hot weather wet bags must be placed over same, because one second-grade can of cream will be sufficient to contaminate easily 50 sound ones.

There are two general methods in practice for skimming the milk. One is to set the milk in shallow pans and allow the cream to rise. The other is the use of the centrifugal separator. The dairyman cannot afford to be without a separator. It removes practically all the butterfat from the milk, while the old method of gravity skimming will leave from one-eighth to one-quarter of butterfat in the milk. The cream from the separator is of a finer quality, and a much bettter product can be made from it. The skim milk is fresh and sweet for feeding, and is far superior to that from the gravity system. There are numerous kinds of separators on the market, but they differ in details of construction, rather than in the principles on which they work. The dairyman should understand these principles. In selecting a separator one should first determine its value for good work and having parts easily accessible, then examine its mechanical construction to see if it will stand long use. There are a number of factors to be observed which influence the separation. The difference in the length of time which it takes to separate cream by gravity and by centrifugal force shows plainly that the time varies with the amount of force applied. The shorter the time the greater the force must be. Skim milk from the separator contains less fat than that secured by the gravity system, showing that the greater force causes more perfect separation. The following conclusions regarding the use of the separator may be drawn:—(1) If the amount of milk that passes through the separator in a given time is a fixed quantity, any increase in the speed of the machine will tend to cause closer skimming, because of greater force exerted; (2) if the amount of milk that passes through in a given time is increased, and the speed remains the same, the skimming will not be so perfect, for the centrifugal force is not exerted on the milk for so long a time. It is evident, therefore, that the closeness of skimming is the result of two factors—time and force; if either of these is decreased, the result will be poorer work. If either is increased, better work will result. Two errors are made in operating separators because of ignorance of the facts just stated. The first in allowing too much milk to pass through the machine. As there is a limit to the practical speed at which the machine can be safely run, it is not good practice to try to overcome the error by increasing the speed beyond the safe point. The feed outlet is usually adjusted so that too much milk will not run through, but cases have been known where operators, anxious to shorten the time of separation, have enlarged the opening, allowing too much milk to pass. This error is not so common as the second, which is to allow the speed of the machine to become too slow. The slow speed does not generate enough force to skim properly, and the result is loss of butterfat in the skim milk. The number of revolutions per minute required by the machine is usually indicated on the machine or in the instruction book belonging to it, and this should be strictly followed. All liquids flow more readily when warm than cold. This is not so noticeable with milk as it may be with molasses or tar, but the principle holds just as true, and is readily shown in the separation of milk. Everyone has observed that cold cream does not flow as readily as warm cream. As cream is one of the products of separation, and has to flow from the machine through a small opening or outlet, it is seen that the warmer it is the more readily it will flow. If the flow of cream is checked, more milk will be forced out of the skim milk outlet, and if the obstruction to the flow becomes too great, butter fat will go out with the skim milk, because it cannot move fast enough through the cream outlet. For this reason, the nearer the temperature of the milk approaches animal heat, the better will be the separation. While some machines are supposed to skim as cold as 60deg. or 65deg. F., it is not a good practice, because the skimming will not be so close. The milk should be at a temperature of 80deg. or higher. It will be seen, therefore, that a third factor, in addition to rate of feed and speed of machine, namely, the temperature of the milk, has a direct bearing on separation, and it may be accepted as true, that the warmer the milk the better the work. Summarised, the points in the operation of a separator, given in their order of importance as bearing on the quality of work, are as follows:—(1) The speed of the separator must be uniform and up to the standard required by the makers of that particular machine. (2) The temperature of the milk should be such as will make it flow readily, the warmer it is the more perfect will be the separation. (3) The amount of milk that is run through the machine should remain constant, and should not be increased over that which is intended for the machine. (4) The machine should be set on a solid base or foundation, so that there will be no jar or shaking about as it is

turned, such as would tend to interfere with the even flow of the milk through the bowl, and thus destroy its efficiency in skimming. (5) The separator should be thoroughly and scrupulously clean, particular care being taken that none of the tubes through which the milk flows become obstructed in any way. (6) The test of the cream can be readily changed by a slight turn of the screw in the bowl. In the mechanical operation of the machine none but the best oil should be used, and this should not be allowed to gum or become dirty on the bearings. It is a good practice to flush the bearings with kerosine occasionally, by making a run with kerosine in the oil cups. This will serve to cut out any gum or dust that has accumulated in the bearings, and will make the machine run free and easy, thus greatly increasing the length of time that it will last and do perfect work. The milk should be separated as soon as possible after milking, while it still contains the animal heat. If the milk has been handled in a cleanly way during milking, it can be poured directly into the receiving can of the separator without straining. The dairyman who depends upon the strainer to clean the milk rather than use cleanly methods of milking, is the one who makes the poorer butter. If it is necessary to strain the milk, a very fine wire strainer should be used. It is very difficult to keep a cloth strainer in good condition, and if not kept in good condition is the seed-bed for trouble. When a strainer cloth becomes yellow it rarely, if ever, smells clean, indicating that decomposition is going on, and that it is not fit for use. For this reason it is best to discard strainer cloths entirely. If a strainer other than wire is used, it is best to use some material, such as absorbent cotton, which can be thrown away at the end of each milking. Before starting the separator, the operator should look carefully at the bearings or wearing parts, putting a few drops of oil on each, and noting whether the oil cups are dropping correctly. Instructions for care and oiling each machine are supplied, and should be carefully followed. The makers have studied this problem, and are bound, for their own protection, to give proper instructions for operation. In the winter time, when everything is cold, hot water should be run through the machine when commencing. This warms up the surfaces and prevents the milk from sticking as it would if cold. It also prevents clogging, and makes cleaning much easier. Bring the machine gradually up to its normal speed, turn the milk in slowly until the tap is full open, and keep a constantly uniform motion on the handle during the entire run. When all of the milk has passed from the supply can, a few pints of skim milk should be poured through. If this is not done a quantity of butter fat will remain in the bowl, because it cannot rise if no more milk goes into the bowl. Pouring in skim milk forces it all out. Warm (not hot) water may be used for this purpose, but that it not always convenient. The first work on completion of the separation should be the care of the cream. It is the product for which all the previous work has been performed, and it is worse than folly to neglect it now that it is secured. The cream must be cooled at once to check the growth of bacteria. The best method for doing this is to place it in a deep, narrow pail immersed in cold water just taken from a well or cool tank. Then stir it for a while to assist in cooling. A good thermometer ought to be used. It will only take a few minutes to cool the cream in the manner mentioned above. As soon as it has cooled, cover the can, to prevent any further bacteria entering Warm cream should never be mixed with cold. The result of mixing is always quick souring. The bacteria in cold cream are dormant or inactive, and will remain so, if kept chilled. So soon as the temperature is raised a little it quickens the life of the bacteria, and they increase at an amazing rate, causing souring in a very short time. Too much emphasis cannot be given to the two points mentioned above, namely, the quick and thorough cooling after separating, and caution in regard to mixing the warm and cold cream. It is of more importance to attend to the cream at once after the separating has finished than anything else at that time. The calves and pigs can wait for their skim milk, but bacteria in the cream wait for nothing until the temperature favorable to their growth is reduced. In hot, dry climates, where evaporation is excessive, another method for keeping milk or cream cool may be adopted. After the cream has been cooled, as described above, set the can out in the open, but shaded from the sun, a bucket of water is set upon the lid of the can, a cloth is made into a bag and slipped down over the can after it has been wetted, the upper end is turned down into the water. This cloth acts as a syphon, and will gradually empty the bucket. From the cloth thus kept wet the can and its contents under the cloth will be kept cool even on

the hottest days. In fact, the hotter and drier the air the greater the cooling effect, as there will be more rapid evaporation. Care must be taken to keep the water fresh and clean. Very soon after the separation has been completed, the separator should be cleaned. It is imperative that it should be washed every time after it has been used, and the sooner it is washed the easier will be the operation. The general directions for washing dairy utensils apply to the parts of the separator that come in contact with milk. In cleaning the machine the frame should not be neglected. Sometimes an operator thinks it is useless to spend time to keep it clean, because it does not come in direct contact with the milk. In most cases, where a machine is to be found dirty and grimy, it will be found out of repair in other ways. The bearings will usually be gummy, and if examined the machine will be found to be out of level, and more often than otherwise the parts that come in contact with the milk will not have been properly cleaned.

A further meeting was held on March 3rd, when the question of the advisability of erecting a jam factory or drying plant on Kangaroo Island to cope with the fruit grown on Cygnet River was brought forward for discussion.

MORPHETT VALE (Average annual rainfall, 23.32in.).

July 24th.—Present: 17 members.

Mr. S. H. Marshall read a paper, "What's Wrong with Australia," and many channels of interesting thought were opened up for discussion.

On July 25th a tractor demonstration was held under the auspices of the local Branch of the Agricultural Bureau in Messrs. Walkers Limited vineyard. A large number of members and visitors attended, representing the majority of the southern vinegrowing districts.

ROCKWOOD.

July 23rd.—Present: 14 members.

LUCERNE CULTIVATION.—Mr. L. Neighbour read the following paper:—"Lucerne has not received the attention it deserves in this district. It ranks foremost among fodders for dairy cattle. When selecting a piece of ground on which to plant lucerne, it must be remembered that drainage is one of the most important items. Lucerne will not thrive where water remains, on, or near the surface for any length of time, so if it is desired to grow lucerne on swamp areas, where either floods or rising springs are likely to be troublesome, something must be done to remedy these defects. Underground drains will be found effective in cases of rising springs, while floods may be guarded against, to a certain extent, by clearing all obstructions from the watercourses before the commencement of winter rains. Cultivation and preparation of the soil should be very thorough, and should commence some months before it is intended to sow the seed. Seed may be sown in either autumn or spring, but I prefer spring sowing. The land should be ploughed after the first rains for preference and left rough until the weeds have made a good start. It should then be cultivated with a disc implement, and, if fairly friable, could be left until shortly before the seed is sown.

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The final working should be very thorough—ploughing, discing, harrowing, rolling—and repeating the process until a fine tilth is obtained. Next comes the selection of the variety to be sown. Hunter River Broad Leaf is without doubt the best; others in order of merit, as I would put them, are South Australian, Provence, and Arabian. Numerous other varieties have been tried on the Murray swamp lands, but these seem to have been most successful. Arabian lucerne makes more winter growth than any of the other varieties named, but it is easily outclassed during the summer. It is also lighter and seems to contain less substance than the other mentioned varieties. For sowing the seed broad casting by hand, if carefully done, will give the best results. The sower should follow a three-leaf harrow, sowing the seed with finger and thumb. An ordinary milk bucket will be found a convenient receptacle for the seed, and if the team driver is instructed to keep just a little ahead of the sower there should be no difficulty in getting the seed spread evenly, provided a calm day is selected. From 12lbs. to 15lbs. of seed is generally sown on irrigation areas. The smaller amount will be found quite sufficient if there is a good germination. The seed should be covered by rolling only, because it does not need to be deeply buried. The young lucerne should be cut so soon as as it shows signs of blooming. The mower blades should be sharp and set to cut as low as possible, otherwise stalks will be left, which later on will become troublesome. Some growers prefer taking off the first cut with a scythe, because it will cut more closely than a machine. Lucerne should be allowed to wilt for at least 24 hours before being fed to stock. If fed to milking cows immediately it is cut, it will impart a strong flavor to the milk and cream. Cows are also liable to bloat if fed on freshly cut lucerne. A sure preventive for bloat is to keep the cows well fed. It is only when a cow eats ravenously that she becomes bloated. Some dairymen contend that milking cows will do well on rough fodders, such as cocky chaff, brewers' grains, &c., when lucerne forms a large part of the diet. During the summer there should be a surplus of lucerne, which can be made into hay. This should be cut when it shows a little bloom, because, if allowed to come into full bloom, it will be found that a new growth has commenced, which will be injured in the cutting. The lucerne is at the best stage when flowering has just commenced. If the weather is very hot the lucerne may be raked on the same day as it is cut; if not, it is advisable to use the horse rake on the second day. It can be cocked on the third or fourth day and carted at the end of a week. The hay should not be left in the paddock until the leaves commence to fall. It will retard the growth of young lucerne under the cocks if left too long. If the lucerne is doing well, a cut should be taken off every six weeks or so during the summer, and it should be irrigated at about those intervals if a large supply of water is available. Open channels, 3 or 4 chains apart, will be found suitable for this style of irrigation, but it will be found necessary to dam the water at intervals along the channel if the fall exceeds a few inches to the chain. A small plot of lucerne will be found to be a valuable asset on the farm where a water supply, pure enough for the purpose, and of sufficient strength to carry a windmill, is available. An annual stirring up with a tyne implement will keep the weeds in check and prolong the life of the lucerne A top dressing of bonedust or superphosphate will also be found beneficial when the lucerne is given an annual cultivation, which should take place early in the winter. A lucerne plot, if well started and cared for, should last for at least 10 years, so that it is well worth while going to a little trouble to keep it in good order. Lucerne grown under irrigation should not be grazed if the best returns are to be expected, but a few pounds of lucerne seed sown with the hay crop will provide good green picking for the dairy herd after the summer rains. Lucerne seed sown in this way will not only add to the value of the pasture for some years, but will give a fine sample of hay, which is much appreciated by dairy stock." In the discussion that followed, Mr. Stacey stated that he had planted a small area of lucerne and had gone to considerable amount of care in draining and preparing the land, but the lucerne, after getting a good start, was eventually destroyed by the lucerne flea. Mr. G. Solly said lucerne could not be grown successfully on the swamp lands unless the soil was deeply drained. Mr. H. Dunn considered lucerne an easy plant to grow where land was suitable. Two good waterings were sufficient in hot weather. He believed in dressing the lucerne plot with stable manure each year in preference to dressing with superphosphates. He did not advise anyone to turn cows on to the lucerne to graze, because it would cause bloat. In cutting lucerne for feed, he would cut in the morning and feed to the cows in the afternoon. Mr. Ness supported

AGRICULTURAL PUBLICATIONS.

The following publications have been issued and are available for distribution at prices mentioned :—

"First Aid to the Horse," by F. E. Place, B.V.Sc., M R C.V.S., &c ; price, 3s. ; posted, 3s. 2d.
"Fruit Tree and Grape Vine Pruning," by Geo. Quinn ; price, 3s 6d ; posted, 4s. 3d
"Poultry Manual," by D. F. Laurie ; price, 1s. 3d. ; posted, 1s 6d.
"Vinegrower's Manual," by A Sutherland (1892); price, 6d. ; posted, 7d.

Journal of the Department of Agriculture, 1s. per annum in advance ; 3d. per single copy to residents in South Australia. Other places, 2s. 6d. per annum ; single copies, 6d. each.

The following bulletins and leaflets may be obtained by residents of South Australia by sending a 1½d. stamp for postage of each copy required ; other places, 3d. each :—

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THE AGRICULTURAL BUREAU.—Particulars of this Organization, of which every farmer should be a member, can be had on application to the Department.

Mr. Neighbour, and thought a large area of land in the district very suitable for growing lucerne. Mr. H. E. Henley favored dragging a bush to rolling for covering lucerne seed, and would sow at the rate of 10lbs. seed and 150lbs. superphosphate. Mr. Green had planted a small area of lucerne, but after a period of three years couch grass choked the plants and very little survived. He favored planting in the autumn, because hot winds were likely to kill off the young lucerne when sown in spring. Mr. J. Steed said drainage was one of the most essential items in growing lucerne. Several other members joined in the discussion, and, generally speaking, members agreed with the paper, and also thought the locality adapted to the growing of lucerne successfully, providing the lucerne flea could be kept in check.

ALDINGA, July 25th.—Mr. C. McKenzie read an interesting paper, "The Management of the Horse." Several other topics of local interest were brought before the meeting for discussion.

PORT ELLIOT, July 21st.—Mr. W. E. Hargreaves contributed a paper, "Hedges or Breakwinds for Homestead, Orchard, or Pleasure Grounds," and an interesting discussion followed. It was decided that future meetings of the Branch should be held at 2.30 p.m. on the third Wednesday of every month.

SOUTH-EAST DISTRICT.

ALLANDALE EAST.

July 27th.—Present: 18 members and visitors.

COLT BREAKING.—Mr. E. Smith, in a paper dealing with this subject, said the first point that should receive attention when the work of breaking in a colt was to be undertaken, was to see that a good strong yard was available so that the colt could not get away. Failing a crush pen, he suggested that the colt should be caught in the stable. When the colt was first taken into the yard, every precaution should be taken not to excite the animal. A rope should be placed on a long stick, and the colt's back rubbed until the rope could be slipped over its head. The colt should be allowed to run around the yard, when it could be brought up to the tie post, and allowed to pull back if it felt so inclined. Then a rope should be placed over the wither, through the forelegs, and through a ring around the colts neck, after which the halter could be put on and the colt given a rest for a while. Next day the mouthing bit should be placed in position, the horse breaker taking the opportunity of speaking in a quiet and soothing voice to the animal. A rope should then be attached to one side of the bit and the colt driven around the yard. After that had been done some little time, the rope should be changed to the other side of the bit and the animal made to run around the yard in the opposite direction. Next, the colt should be harnessed with a surcingle and crupper, and the reins tied back to the surcingle. One rein should be made somewhat tighter than the other and the colt left alone for an hour or so. After the spell, the tight rein should be loosened and that on the other side of the bit tightened. When the education of the colt had proceeded along these lines for a day or two, the horse should be taken out of the yard and driven around the paddock with the reins. If the colt was to be used for buggy work he suggested working the youngster alongside a quiet horse for an hour or two. Next day the colt could be put through the same performance. In the discussion that followed, Mr. F. Tooth said it was a good plan to place a ring in the top of the post in the centre of the yard, to which the halter rope should be attached so that the colt could circle around the yard. Mr. McCabe said if a rope was placed under the tail of the horse the colt could be brought up to the post without any difficulty. Mr. T. Earl favored a two-wheeled vehicle for breaking in the colt because there was less danger of a capsize. Mr. J. Stewart thought a long shafted vehicle should be used if the colt was given to kicking. Mr. C. Griffin mentioned the use of heavy sledges for breaking in draught colts. Mr. W. Laslett considered that when the sledge was used there was a danger of the colt getting its legs over the chains and starting to kick. Mr. McCabe thought that the foal should be

taught to lead and tie-up, so that time and trouble would be saved. Mr. Stewart considered it advisable to break in the colt with an open bridle, but Mr. Butler, who had tried that plan, found that the horses learned to shy at almost any object. Mr. E. Smith expressed a preference for the breastplate when the horse was worked in a cart, but Mr. Tooth thought a breastplate too narrow for heavy work. Mr. Smith said that during the war all the horses used breastplates, and at times the animals were called upon to do very heavy work.

GLENCOE (Annual average rainfall, 33.84in.).
July 27th.

AMBER CANE.—Mr. S. J. Bonney read a paper dealing with this subject, the salient points of which were the ability of the crop to resist droughty conditions and apparent partiality to the darker colored soils. The speaker said that gradual feeding off was necessary, say half an hour the first day, one hour the second, and so on until it was feasible to leave the cows all day. That practice modified the risk of the cane "blowing" the cows. As to the method of sowing, Mr. Bonney said that he used 15lbs. to 20lbs. of seed per acre and sowed through every other drill. He sowed in November. The crop made its appearance in five or six days and was ready for feeding off in the following February. He fed his cows continually upon it until May and regarded the cane as a great success. An interesting discussion followed, during which Mr. Ferguson said that in all summer fodder he found that especially good soil cultivation was imperative. Mr. A. Tregenzea said that he had had very good results from Japanese Millet, though it did not grow to such a height as Amber Cane. A few members generally thought that Amber Cane was rather susceptible to frost, and that in bad years, such as the present, it was rather risky to put too large an area under crop.

MOUNT GAMBIER (Average annual rainfall, 32in.).
August 11th.

DEALING WITH SECOND-CLASS LAND.—Mr. A. A. Sassanowsky read the following paper:—"Our soils can be divided into three separate classes—(1) good volcanic and alluvial soil; (2) sandy land mixed with patches of good soil; and (3) poor sandy soil. The first has been cultivated to the best advantage, divided into small blocks, and has risen to such values as to be used mainly as residential blocks, whilst the occupants are working at other industries, and not solely dependent on their blocks for a living. The poor sandy soil is now overrun by the rabbit pest, and is only suitable for forestry, and the Government should acquire it and go in for more practical forestry. Our forests have wonderful productive powers if only guarded from fires, whilst the soil is very suitable for the growing of pines. Thus, instead of being waste land and a breeding ground for rabbits, it would become a valuable asset to the State. The second-class land, not land valued from £30 to £35 per acre, but of values from £8 to £15 an acre, is that which the Government is now repurchasing for closer settlement, and it is on this land I wish to speak, and by judicial handling, instead of exhausting it, try to keep its fertility and improve it. The blocks, when allotted to the settler, are usually overrun with rabbits, but there is a fumigator on the market which will kill the vermin effectively. However, this is a fairly expensive operation, but when once the land is cleared of rabbits it is not very expensive to keep them under. It is in this that the district councils fail to help those who try to exterminate the rabbits by neglecting to carry out the Vermin Act. Councils should be more severe on those possessing land of such values, who neglect to kill the rabbits. It is better for the councils to enforce the Act than to try to kill the rabbits for the landowners, and much cheaper. The blocks are being cut into areas too small at present for the value of our products, but the settler is there, and he is supposed to make a living from it. He is only going to do this by cultivating the whole area, and it is quite possible he will exhaust the land. This land will not stand cultivation every year, and after the third or four crop will be quite likely covered in sorrell. It would be better not to try and pay for it in quick time, thus exhausting it, but to take

a longer period to make it your own by 'walking off' part of the profit in stock than by carting it off in grain. This class of land is not suitable for growing summer fodders, because the light sandy parts of it are apt to blow in the summer time, so the farmer has to do his cultivation in the autumn, and, in order to safeguard against blowing in the next summer, he has to have a coat of grass or stubble in the spring. This class of soil is mainly suitable for growing oats. The average yield of oats for past years has been about 28bush., and the price approximately 3s. a bushel. The cost of production to the mill door or on trucks is about £3 per acre, leaving a balance of £1 4s. an acre profit. By sowing oats in the early autumn, to be fed off with sheep, you have a very good prospect of having sufficient feed by the middle of June to carry a ewe and lamb, and quite possibly a balance to fatten more sheep. Early sowing and feeding off has the tendency to encourage the growth of Schank clover, which is a fast grower in the spring and feeds well when dry in the summer. The cost of putting in the green feed would not be so much as for a crop to be harvested. It would be about 18s. per acre. The value of a ewe and lamb is hard to estimate, because they are not sold by weight over the scales (as is done in some other countries), a system which should be introduced here, as the present method of guessing the weight does not encourage the farmer to prime his stock. For comparison, we can estimate wool, lamb and gain in weight of ewe at 30s. per acre. In the one case you are exhausting the land; in the other you are not, and still have the chance of reaping a good crop every fourth year and raising the average from 28bush. to 40bush. an acre, and by so doing your ledger will very nearly balance. By dividing your property into paddocks so that one paddock is harvested every fourth year, you will keep the fertility of the land going, with a chance of improving it.'' Mr. R. P. Pritchard advocated the use of peas on second-class land. Land that had been overworked could be restored by the use of peas, which produced a better crop than oats. The difficulty of harvesting the crop had been overcome. Mr. Gurry said it was necessary that something should be done to keep up the fertility of the second-class land. He found that no fodder was equal to speargrass, which grew well in the light soil in the neighborhood of his property at Glenburnie. He had not seen Subterranean clover grown at Glenburnie. Something should be done to enable the land to be rested sufficiently at intervals, in order that it would return to its former fertility. It was only natural that when crop after crop was planted the land became impoverished. Mr. J. H. Buck said a crop of peas served the purpose of maintaining the fertility. There was no need to worry about harvesting them, for sheep could be allowed to graze on the crop. The next year they could be followed with a crop of barley. If the same crops were sown year after year the land would become so poor as to give unpayable results. Mr. G. H. Kilsby said peas as a crop had been neglected in Mount Gambier. In and around the Strathalbyn district extensive use was made of them, and they were excellent for raising sheep. The sheep were turned in on the crops and invariably topped the market when sold. This was the cheapest and easiest method of maintaining the fertility of the land. Mr. A. J. Hemmings said, although some of the soil referred to would be suitable for afforestation purposes, there was a large area of it that was only suitable for growing stringybark, and that only of a quality suited for firewood. Much of the inferior land had been offered to the Department, but on being inspected by the Government experts had been turned down as totally unsuitable for the growing of pines. Still there were large areas that would grow pines. There was a big demand for all timber, but the Department could not, with the limited funds at its disposal, plant more extensively than they had been doing. Timber was a very important item, and all farmers should have their wood lot. Mr. F. C. Beech said the growing of peas on light soil was to be advocated, but it was not possible to plant them in their district until late, on account of the severe frosts. He would also recommend the growing of soy beans, as they were very hardy and made good fodder.

MOUNT SCHANK, May 27th.—The subject ''Silos'' was brought before the meeting by the Chairman (Mr. Swaffer), and a lengthy discussion followed. Mr. Davidson also read a short paper, ''Calf Rearing,'' which provoked an interesting discussion. A further meeting was held on July 27th, at which a paper under the title ''Farming'' was read by Mr. J. Davidson

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

No. 3. OCTOBER 15, 1923. VOL. XXVII.

Published Monthly by the Department of Agriculture.

Edited by H. J. FINNIS.

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All communications to be addressed:
"The Editor, Journal of Agriculture, Victoria Square, Adelaide."

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G. F. JENKINS,
Minister of Agriculture.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Replies supplied by C. A. LOXTON, B.V.Sc., Government Veterinary Surgeon.]

"J. G. S.," Wilmington, has mare with a bladder-like swelling which becomes more pronounced after foaling.

Reply—The mare has an inversion of the bladder, which is not of uncommon occurrence. No veterinary officer is available to visit you, and I would suggest that you make an attempt at reposition of the organ. Obviously the sooner you undertake this the more favorable is the chance of recovery. It will be necessary to administer chloroform, and the bladder should be carefully cleansed and disinfected before reposition is attempted. Probably the doctor who diagnosed the condition would explain the details of the operation.

"H. W. S.," Modbury, reports mare with a slight discharge from one nostril.

Reply—I advise you to continue the use of linseed meal and condition powders. If the discharge becomes worse try inhalations of steam, medicated with friar's balsam. Discharge from one nostril often indicates a chronic inflammation of the cavities of the head. If it does not respond to simple remedies it may require surgical treatment.

Hon. Secretary Agricultural Bureau, Lake Wangary, asks particulars of pizzle disease in sheep.

Reply—This disease is known as "balanitis," or inflammation of the sheath. It is most common in Merinos, and the best way to prevent it is to keep the wool clipped round the parts in close woolled sheep. Do not cut off the long hairs growing from the end of the sheath. The best application for the disease is a solution of bluestone, 3ozs. to a gallon of warm water. Apply every few days. In bad cases it is necessary also to slit the sheath along the lower border.

"A. C. W.," Booleroo Centre, has light mare with a swelling of the chest in front of the forelegs.

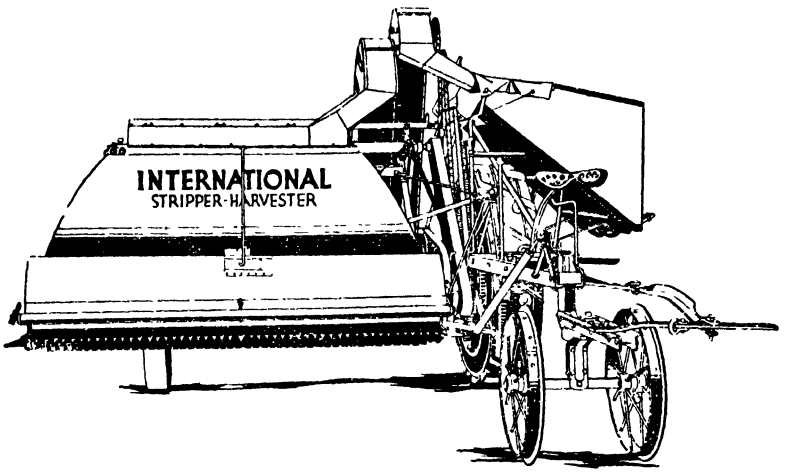
Reply—These swellings are due to any debilitating condition. So long as she has a good appetite and does not show any constitutional disturbance, you need not regard it seriously. Put her on light laxative diet, mashes, and green stuff, and give her saline medicine, such as Epsom salts 1oz., saltpetre one teaspoonful, twice daily in mash or drinking water. Allow her to take a little exercise in a small paddock or yard during the day time.

Secretary Agricultural Bureau, Shoal Bay, submits the following questions:—

(1) Bluestone for stomach worms. Reply—The strength of bluestone solution for stomach worms is 1 per cent., this would be ¼lb. bluestone to 3galls. of water. Dose—1½oz. for lambs, 3oz. for sheep. Whether one teaspoonful of Cooper's Powder Dip to a bottle of water is injurious depends upon the size of the bottle. This amount in a pint bottle would not be injurious in the dose you mention.

(2) Whether Cooper's Dip will cure lice in horses. Reply—Yes, but it must not be used any stronger than the usual strength for dipping sheep.

(3) The cause of a four-tooth grass-fed Merino ewe loosing its wool. Reply—Any severe disturbance in health, such as fever, may cause a loss of fleece, less serious conditions may cause a "break" in the wool.



WHEN this year's harvest opens with its crowding rush of work, nothing must be allowed to interfere with saving all the crop. The safe thing to do is to place your order now for any harvesting machine you are going to need. Now is the time to plan your harvest work.

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"W. S.," Wudinna, has mare "groggy" in the legs after eating wheat.

Reply—Your mare is suffering from laminitis (founder). You can give her some relief by putting her in a foot bath two or three hours a day. She should stand in cold water up to the fetlocks. If you are unable to provide a foot bath you can apply cold swabs to the feet if they are hot and painful. This disease frequently becomes chronic, and causes more or less structural alterations in the hoof.

"J. T. B.," Gladstone, asks treatment of pigs for intestinal worms.

Reply—Give turpentine in doses of one teaspoonful per 100lbs. live weight, and repeat daily for three days. This is most conveniently given in milk, with which it forms an emulsion. The pigs should be kept without food for at least 12 hours. If many pigs are being treated they should be divided into lots of three or four, so that each will get the proper dose.

"G. B. K.," Yadnarie, has horse with a hard lump on the shoulder at the back of the collar.

Reply—I advise you to apply a little red blister. Clip the hair off the swelling. Rub the blister in for five minutes. Tie him up short for an hour or so after the application. This may cause an abscess to develop. If so, you should evacuate it. Keep the wound clean and dress with disinfectants.

"C. B. B.," Warooka, reports pony with a swelling of the chest and legs.

Reply—I advise you to give him one-half of a level teaspoonful of quinine sulphate twice daily. Mix this in a little treacle and give it on the tongue Keep him in a clean, loose box or shed. Give him sufficient mash and green stuff to keep his bowels relaxed. Give him also a ½oz. Epsom salts in his drinking water daily. Bathe the part where the swelling has burst with warm water containing a little antiseptic.

ORCHARD NOTES FOR SOUTHERN DISTRICTS FOR OCTOBER, 1923.

[By C. H. BEAUMONT, Orchard Inspector and Instructor.]

The most important work for the month is the use of the spray pump, with the right solutions, so that the fungus and insect pests may receive a check. Aim at preventing, and there will be less need to try to cure. The weather plays an important part in the development of fungus pests particularly, and thus to some extent controls the use of the pump, and we must be guided by the conditions which prevail. The use of Bordeaux solution before buds burst and occasionally afterwards is the best method of stopping fungus pests from getting a hold on fruit trees and the fruit.

Lime-sulphur solution is very useful; it is a fungicide as well as an insecticide; it is useful to lessen thrip; it is very good against red spider at a time when the mite is getting about; it is also the best

remedy for oidium of the vine and mildew of the strawberry, and it is held by many growers that it is good for aphis on peach and citrus trees as well as woolly aphis. The last-named two, however, are much better dealt with by Black Leaf 40 or similar solutions. Lime-sulphur is used at the rate of 1½galls. to 100galls. of water. For codlin moth and other chewing insects there is nothing better than arsenate of lead; with intelligent use, there will be no need to worry about the doings of the neighbors; it will be effective in your garden. For codlin use 1lb. to 30galls. of water. For curculio use 1lb. in 8galls. of water, and for cut worm the same strength. Pear or cherry slug will be killed by the weaker solution. For borers place in the hole a small plug of cotton wool dipped in petrol and close the hole with clay.

Vignerons should not neglect preparation for downy mildew; Bordeaux mixture is a certain preventive if properly used.

The surface of orchards and vineyards should be kept loose and free from weeds.

W. & W., 890

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METAL GATES AND FENCES

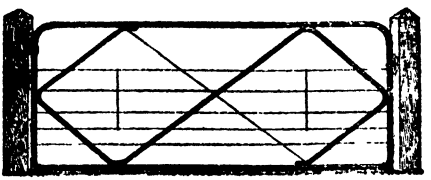


Fig. 201.—Cyclone "Z" Gate.

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THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

THIRTY-FOURTH ANNUAL CONGRESS.

The thirty-fourth Annual Congress of the Agricultural Bureau was held in the Victoria Hall, Gawler Place, Adelaide, on September 10th, 11th, and 12th, 1923. During the opening and following session, the officers of the Department of Agriculture and members of the Advisory Board of Agriculture as undermentioned attended:—The Minister of Agriculture (Hon. G. F. Jenkins, M.P.), the Vice-Chairman of the Advisory Board (Capt. S. A. White, C.M.B.O.U.), the Director of Agriculture (Professor Arthur J. Perkins), the Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S.), the Horticultural Instructor (Mr. Geo. Quinn), the Dairy Expert (Mr. P. H. Suter), the Superintendent of Experimental Works (Mr. W. J. Spafford), the Assistant Dairy Expert (Mr. H. J. Apps), the Wool Instructor of the School of Mines (Mr. A. H. Codrington), the Deputy Horticulturist and Manager of the Berri Orchard (Mr. C. G. Savage), the Manager of the Blackwood Orchard (Mr. R. Fowler), the Manager of the Minnipa Experimental Farm (Mr. R. Hill), the Field Officer (Mr. S. B. Opie), the Experimentalist, R.A.C. (Mr. R. C. Scott), and Col. Rowell, Messrs. A. M. Dawkins, F. Coleman, C. J. Tuckwell (Members of the Advisory Board of Agriculture), and the Secretary (Mr. H. J. Finnis).

DELEGATES.

The following delegates represented the undermentioned Branches: Allandale East—C. Griffin, S. Butler; Amyton—A. Fuller, L. Mills; Arthurton—S. Willing, T. Howlett; Balaklava—W. McPharlin, D. McArthur; Barmera—E. Farmer, N. McKenzie; Balhannah—H. Boehme, G. Edwards; Beetaloo Valley—J. E. Bird; Belalie North—H. and W. Cummings; Berri—A. Mills, A. Jarvis; Blackheath—H. Paech, E. Pym; Blacksprings—C. Hudd, B. Hienrich; Blackwood—R. Fowler, S. B. Opie; Block E—R. Fisher; Blyth—J. Pratt, W. Ninnes; Booleroo Centre—W. Whibley, I. Michael; Borrika—E. Cowled; Brentwood—R. Farmer, R. Anderson; Brinkley—L. Rust, C. Pearson; Bundaleer Springs—M. Cronin, P. Kerin; Bute—J. Read; Butler—A. Pfitzner, D. Butler; Cadell—A. Tonkin, R. Frankel; Carrow—R. Kemp, H. Byrne; Cherry Gardens—C. Ricks; Clare—J. Scales, Bro. Boehmer; Claypan Bore—J. Gray, A. Bickford; Colton—L. Barnes, F. Lewis; Coomandook—R. Upton, M. Wilkin; Coonalypn—G. Wall, F. Tregenza; Crystal Brook—A. Clarke; Currency Creek—H. Higgins, G. Ritchie; Cygnet River—A. Osterstock, F. Wakelin; Darke's Peak—R. Kobelt; Edillilie—T. Sachs, A. Palm; Elbow Hill—A. Ramsey, S. Wake; Eurelia—C. Stott, W. Canny; Farrell's Flat—H. Thompson, G. Powell; Frances—L. McInnes, W. Montgomery; Gawler River—A. Roediger, T. Rice; Georgetown—W. Haynes, R. Matthews; Geranium—W. Pannell, W. Hughes; Gladstone—L. Sargent, J. Bergin; Glencoe—S. Bonney, A.

von Duve; Glossop—G. Jackson; Goode—S. Folland, C. Linke, A. Moore, W. V. Bond; Halidon—C. Russell, L. Seymour; Hartley—P. Paech, C. Hassam; Hawker—J. Smith, C. Pumpa; Iron Bank—C. and I. Morgan; Kalangadoo—N. McCall, T. Bott; Kangarilla—A. Bottrill, R. Morphett; Keith—H. Nagel, P. Petersen; Ki Ki—O. Blucker, L. Angus; Kilkerran—B. Koch; Kongorong—W. Aslin, F. Perkins; Koonibba—J. Foggo, Rev. Hoff; Koppio—G. and T. Gardner; Kybybolite—E. Staude, S. Billinghurst; Lake Wangary—W. Sheppard P. Puckridge; Lameroo—C. Needs, W. Kriewaldt; Lipson—S. Swaffer, W. Blacker; Lone Gum and Monash—E. Whitelaw, S. Ranford; Lone Pine—T. Fromm, H. Kappler; Loxton—S. Fuller, —Nettleton; Lucindale—L. McInness, G. Langberg; Lyndoch—J. Hammatt, H. Kennedy; McGillivray—R. Wheaton, E. Seagar; McLachlan—G. Roe—E. Klopper; Maitland—G. Pearce, P. Bowey; Mallala—J. Catt, W. Earl; Maltee—A. Marchant; Marama—A. Greig, T. Hinkley; Minnipa—J. Head, G. Williams; Meadows—S. Dodd, H. Michelmore; Milang—W. Giles, W. McMillan; Millicent—J. Mullins, D. Hannaford; Monarto South—H. Patterson, M. Thomas; Moonta—A. Ferguson, P. Ford; Moorak—J. Nicholls, H. Tarrant; Moorlands—L. Spurr, V. Piggott; Moorook—S. Perkins, A. Lamant; Morphett Vale—E. Hunt; Mundalla—S. Stoddart; Murray Bridge—A. Potter, E. Neumann; Mount Barker—J. E. Smith; Mount Bryan—J. Simpson, W. Quinn; Mount Bryan East—J. Thomas, Mount Gambier—R. White, D. Collins; Mount Pleasant—C. Royal, J. Miller; Mount Remarkable—W. Bishop, T. Bell; Mount Schank—J. Davidson, C. Doman; Nantawarra—R. Nicholls; Naracoorte—G. Turnbull; Narridy—J. Darley; Narrung—J. Steer; Nelshaby—A. Laurie, F. de Silva; Netherton—A. Coates, A. McLean; New Residence—A. Foord; North Booborowie—J. Thomas, F. Clark; Nunkeri and Yurgo—H. Sanders, J. White; O'Loughlin—E. Lutz, A. Kloeden; Orroroo—J. Robertson, H. Matthews; Owen—A. Freebairn, R. Harkness; Parilla—C. Foale, A. Wilden; Parilla Well—E. Slater, A. Kretschmer; Paskeville—R. Cowan, R. Train; Pata—L. Christie; Penola—S. Ockley, W. Clifford; Petina—H. Howard, W. Penna; Pinnaroo—F. Bonnin, H. Davis; Pompoota—J. Bray, A. Lambert; Pygery—D. Smith, E. Edmonds; Port Elliott—W. Green, H. Welch; Ramco—W. Hunter, J. Odgers; Rapid Bay—A. Bennett; Redhill—H. Crouch, D. Torr; Rendelsham—V. Smith, L. Bradshaw; Riverton —J. McInerney, E. Gray; Riverton Women's—Mesdames T. Longbottom and J. Thomas; Roberts and Verran, F. Masters; Rockwood—E. Heath, H. Henley; Saddleworth—F. Coleman; Saddleworth Women's—Mesdames J. Garrett, A. Baldwin; Salisbury—C. Baker, E. Tate; Sandalwood—J. Mathiessen, D. Thompson; Shoal Bay—A. Nash, G. Barrett; Smoky Bay—F. Gregor; Stockport—R. Whitelaw, D. Stribling; Strathalbyn—G. Sissons, S. Bottrill; Streaky Bay —C. Williams, H. Wharff; Tantanoola—W. Haines, E. Altschwager; Tarcowie—J. Ninnes, O. Davidson; Tarlee—A. Fuller, W. Branson; Tatiara—A. Milne, C. Wylie; Two Wells—S. Hosgood, S. Wasley; Virginia—W. Lang, W. King; Waikerie—L. Pope, H. Milner; Warcowie—W. Sanders, A. Ryan; Watervale—E. Holden; Weavers—A. Piggott, A. Sherriff; Whyte-Yarcowie—S. Hunt, G. McGregor; Wilkawatt—A. Ellis; Williamstown—G. Brown, W. Mitchell; Williams-

town Women's—Mesdames W. Gower and G. Hammatt; Willowie—A. Bartlett, G. Bull; Wilmington—J. Hannigan, J. Modystach; Windsor—A. Williams; Winkie—H. von Bertouch, A. Ingerson; Wirrabara—E. Pitman, E. Stevens; Wirrilla—J. Jamieson, L. Moore; Wirrulla—F. and H. Doley; Wudinna—F. Johnson, W. Cabot; Wynarka—J. Beck, M. Blacket; Yadnarie—R. Forbes, A. Jericho; Yallunda—R. Newell, E. Butler; Yellanna—G. Proctor, J. Laurence; Younghusband—G. Mann, H. Gowling; Ashbourne—W. Cuming, V. Cox; Myrla—J. Schumacher, B. Jenke; Kalangadoo Women's—Miss E. Hemming, Mrs. R. McDonald; Mannanarie—R. Bretag, J. Symons; Cobdogla—A. Coates, W. Sutton; Pinnaroo Women's—Mesdames A. Jones and W. Muirhead; McLaren Flat—L. Hussey, G. Connor; Light's Pass—W. Boehm, S. Ellis.

Monday Evening.

OPENING CEREMONY—THE GOVERNOR'S ADDRESS.

His Excellency the Governor (Sir G. T. M. Bridges, K.C.M.G., C.B., D.S.O.) said there was no doubt that the Bureau did splendid educational work in collecting and disseminating information, and had greatly assisted the admirable progress made in agriculture in South Australia during the past 30 years. The problems with which they had to deal were many and varied. The experience of the past demanded due recognition of scientific research. He hoped all farmers were aware of the scientific machinery at their disposal, and that they would make use of it, especially in such matters as the early reporting of any new animal or vegetable pests.

The Possibilities of Science.

If the necessary data could be collected and sufficient time given, there was practically no question, however difficult and complex, to which science could not find the answer. In Australia, a new continent, there was a vast store of learning that was hidden from them, and the surface of it had only been scratched. For example, the great boon of superphosphates had been discovered, but who knew of their real action on the soil? It would seem that there was room for a careful soil survey of the whole State, as had been done in most other countries. For that, and other research work, it was to be hoped that the magnificent bequest of the late Mr. Peter Waite would soon be made available. In opening the congress, he felt at a disadvantage to his predecessor in office, who was so well versed in agriculture. His knowledge of the subject that most interested them was of a superficial nature and he came to learn. On the other hand, he had travelled a good deal, with his eyes open, and all over the world he had seen agricultural communities exercised with the same problems as those which confronted them to-day.

Afforestation.

One of the things, he said, that stuck the newcomer to this country, was the wholesale way in which it was being shorn of its splendid timber, and the fact that 40 per cent. of the timber used in Australia was imported. He would like to put in a plea for the trees which had

WHAT WAS ACCOMPLISHED

How Many Acres Did He Plow?

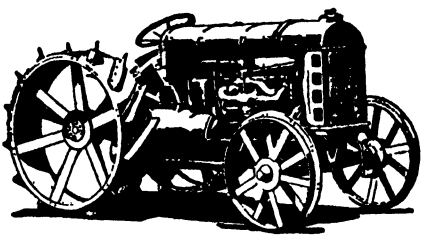
Results count. It takes one man a whole day to plow a stated number of acres and another a half day. The man who plows these acres in half the time is producing results, the other is working hard, but wasting time. Don't figure the results of your labor on the basis of so much time and so much hard work—BUT UPON WHAT IS BEING ACCOMPLISHED. Plow YOUR ACRES in half the time.

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a high value, not only for timber and fuel and shelter, but for their by-products, and possibly for their influence as forests on the rainfall of the country. In regard to [illegible] trees, he added, there existed an admirable Forestry Department which could supply not only advice, but suitable trees for any plantation.

The farmer of the Canadian and American plains, he continued, working with every modern mechanical assistance; the Moujik of the great south Russian wheat steppes, which poured their produce into the admirably organised and specially constructed port of the Black Sea; the Indians; the patient peasant of Albania, still working within a few hours of Vienna, with his archaic wooden plough drawn by a single ox—all those were concerned as to the price of their products, and the existence of markets.

Falling Prices.

The price of wheat, the staff of the world's life, seemed to follow a definite course of fluctuation after upheavals such as had been gone through, and it now appeared to be coming back to its normal level After a good innings of high prices, the farmer was faced with the necessity of reducing the cost of production, in sympathy with the inevitable fall in prices, and that process was going on all the world over. The energy and resource of the producer, no doubt aided by the activities of the bureau and the march of science, would successfully achieve that result. He was convinced that markets existed for everything that Australia could produce. But they would have to be secured, and sometimes even created. He learned with interest that women's branches of the Agricultural Bureau had been formed.

Boys' Clubs.

In that connection he would like to mention that there seemed to be a promising future for boys' agricultural clubs in connection with the Boy Scout movement. Those clubs had had very great success in Canada and America. Their turnover of profits had been phenomenal. The subject would come up for discussion at a meeting at Government House on Friday next. While speaking of that matter, he would like to ask the members of the Agricultural Bureau to help "the Barwell boys" as far as they possibly could, by making due allowance for their different upbringing, and seeing that they had every possible chance not only to work, but to learn to become good farmers and good Australians. He was glad to see the Minister of Agriculture in the chair that night, knowing that he was a practical producer himself, a product of Roseworthy College, and in close touch and sympathy with the difficulties and needs of the primary producer. He (the Governor) could assure them that anything he could do to further the progress of agriculture, or the welfare of the primary producer, would be done. He wished the Bureau all success and prosperity (Applause).

THE MINISTER'S ADDRESS.

The Hon. G. F. Jenkins, M.P. (Minister of Agriculture), in the course of his remarks, said that he felt very pleased indeed with the seasonal prospects. The outlook had seldom been brighter. Although

portions of the lower and middle north country were not looking too satisfactory, that was more than compensated for by the excellent prospects throughout Eyre's Peninsula and the country Murray. It would not be safe for him to venture an opinion with regard to prices, but he had heard of forward sales of wheat at higher prices than he had anticipated. He trusted they would go still higher.

The Co-operative Spirit.

He was pleased to note that the co-operative spirit was strong at the present time among agriculturists. Evidence of that had been given under the administration of the Loans to Producers Act, for it was estimated that by the end of June next, no less than £150,000 would have been loaned to producers. The practice of establishing farmer's plots on private farms in association with local Branches of the Bureau was being continued, and he believed was giving satisfaction. Several Government farms had been placed in typical districts, with the object of stimulating agricultural production. The managers were supposed to keep in active touch with their districts and to afford all assistance and advice within their power. It was believed that they were doing so, and that their efforts were appreciated by their neighbors.

A Profit-earning Venture.

The Turretfield demonstration farm had been run on a purely financial basis since 1921. It was satisfactory to note that after payment to the Government of interest on fixed and floating capital, and £300 towards the manager's salary, the net profits for two seasons aggregated £921, or at the rate of 6s. 7d. per acre per annum on the whole area. The farm accounts were being used with a view to determining as accurately as possible the cost of various operations in farming. Last season it cost £2 to grow and stack a ton of hay, inclusive of all general items of expenditure, and 5s. to grow and store a bushel of wheat.

Roseworthy and Minnipa.

A comparison of Roseworthy and Minnipa Farm acreage returns for the years 1915-22, added the Minister, showed—with a total rainfall of 18.21in. at Roseworthy, and 15.34in at Minnipa—the following:—

Crop.	Roseworthy.			Minnipa.		
	T.	c.	lb.	T.	c.	lb.
Hay	2	1	43	1	10	53
	Bush.		lb.	Bush.		lb.
Oats	25		4	29		7
Barley	27		35	16		12
Wheat	18		48	19		18

The average wheat yield at Minnipa, he continued, in 1921-22 from 472 acres was 15bush. 20lb. Booborowie, Minnipa, and Veitch were disposing of the bulk of their grain for seed purposes. The demand for first-class seed grain was far in excess of what the farms were able to supply. It had therefore been decided to limit the quantity supplied to individuals up to February 1st in each year to five bags of any one variety, and not more than 15 bags of different varieties

of the same cereal. After February 1st, if seed grain was still available, larger quantities would be supplied if application were made. At Minnipa the olive groves now covered 50 acres, and it was hoped that in time they would supply both suitable shelter for live stock in the fields and be a source of revenue to the department.

Orchard Drainage.

A salt patch had developed gradually on a moderate hill slope of the Berri State Orchard, and last season a complete drainage scheme was laid down. Hitherto the results secured had been highly satisfactory. Between mid-November, 1922, and the end of July, 1923, about 6¼ tons of soluble salt were evacuated by the drain pipes Already neighboring trees were showing improved growth, and it was hoped in a couple of years completely to reclaim four acres which at present were more or less barren.

Crop Competitions.

After looking thoroughly into the proposal to grant Government assistance with a view to encouraging wheat crop growing competitions, he was convinced that if the agricultural community of South Australia would take the matter up, nothing but good would come of it. The spirit of rivalry that would be engendered must be for the good of the industry generally. A motion had been placed upon the Assembly notice-paper by Mr. Robinson that £500 should be put on the Estimates for that purpose, and doubtless that member would be pleased to know that the Government had taken "the bull by the horns" in the matter.

With the object of encouraging wheat-crop growing competitions in South Australia, the Government was prepared, subject to the fulfilment of the conditions set out below, to grant assistance to Branches of the Agricultural Bureau as follows:—1. To assist in securing suitable judges; 2. To provide a return rail ticket to enable one judge to travel between Adelaide, or his place of residence, and the centre in which the competitions are being held; 3. To make to the Branch or Branches conducting a competition a grant of 10s. for each entry received, provided an amount equivalent to such grant is collected by the Branch or Branches, for use in defraying expenses or providing prizes for such competitions, and provided also that no such grant for any competition shall exceed £5 in any one year.

Branches of the Agricultural Bureau will not be eligible for assistance unless:—

1. Competitions are conducted in such a manner as to be acceptable to the committee appointed to supervise such competitions, and consisting of the Director of Agriculture (*ex officio*), the Superintendent of Experimental Work (Mr. W. J. Spafford), the Deputy Chairman (Mr. W. S. Kelly), and the secretary (Mr. H. J. Finnis) of the Advisory Board of Agriculture; 2. Unless they are prepared to co-operate with neighboring Branches of the Agricultural Bureau, with the object of ensuring that each competition shall cover as wide an area as soil and climatic conditions will allow. The determination of districts will be subject to the approval of the Minister of Agriculture;

3. Unless they enlist the aid and co-operation of any agricultural show or similar societies which may exist in the area represented by the competitions; and 4. Unless they are prepared to conform to the following conditions:—

(*a*) Each crop entered must be of an area of not fewer than 50 acres. Entries need not necessarily be confined to one variety, but the maximum number of varieties that will be permitted in one entry is three. Each entry must be in one block or paddock. Should, however, a person desirous of submitting a crop for competition not have an area of 50 acres or more in one paddock or block, he may submit as an entry the whole of one paddock or block of wheat, together with an area of one other paddock or block, sufficient to make up the minimum area of 50 acres.

(*b*) A minimum of eight entries is necessary before any obligation to provide assistance is incurred by the Government.

(*c*) Wheat crops entered for competitions are to be judged on the following scale of points:—Apparent yield, 60; trueness to type, 10; freedom from disease, 10; freedom from weeds, 15; evenness of crops, 5; total 100.

(*d*) Each competitor must supply to the judge, before such competitor's crop is judged, a statement setting out:—(1) The area of each variety constituting the entry; (2) the date of seeding; (3) the rate of seeding; and (4) the nature and quantity of any fertilisers used.

Official Testing.

If dairymen wished to improve the natural milking tendency of their herds they must do it by the use of bulls with good milking ancestry. Hence the importance of submitting the dams of all pure-bred milking strains to an official herd testing. The whole matter was being reorganised in South Australia, and it was hoped that in course of time dairymen would be able to insist upon the production of proof that any bull they purchased came from good milking ancestry. At present there were under test 18 pure-bred herds, comprising three Friesians, 12 Jerseys, two Illawarras, and one milking Shorthorn. All officially tested bulls would be eligible for subsidies under the Dairy Improvement Act, 1922. It was intended to hold sales at important country centres wherever sufficient inducement offered. Increase in the mean output per cow meant increased production. Herd testing, by compelling the dairymen to study the output of individual cows and their response of improved feeding methods, and by the healthy rivalry it developed, was an essential aid toward increased production, and for that reason the Government had encouraged the formation of herd-testing societies. Several had been formed, but it was regretted that one had not been established in the north, with Laura as its centre, for it was believed that exceptional results might have been obtained in that district. In the first year of the Mount Gambier Society, Mr. E. W. Tollner secured first prize, with an average of 879.27galls. of milk, and 385.81lbs. of butter fat per cow from a herd of 15 to 16, which was very creditable. (Applause).

At the instance of Capt. S. A. White, seconded by Mr. A. M. Dawkins, a hearty vote of thanks was accorded His Excellency for his opening address.

Tuesday Morning, September 11th.

FARM MANAGEMENT AND EFFICIENCY.

Proceedings were commenced on Tuesday morning with the following paper contributed by Mr. P. H. Jones, of the Pinnaroo Branch:—

The title of this paper probably suggests to some that the writer—at least in his own opinion concerning the necessary qualifications—would be possessed of unlimited abilities and the embodiment of all those good qualities that go to the making of success. I hasten to correct any such impression that may have become fixed in your mind, and assure you that I approach the subject with a large degree of diffidence. However, I make no apology for being in my present position. The topic is not of my own seeking; it was one suggested, and the request made that I should give expression to my views. It may be advisable, perhaps, to remind you that it has been written, or said, something to the effect that a fool will butt in where the wise make themselves scarce. What I hope to compile will be made up from observation, practical experience, reading, and a little thought. The facts, as voiced, are my beliefs, but the ideas I have may be entirely wrong and I am open to conviction.

The first point is whether any form of business or management is necessary for the efficient working of our farm, or is it sufficient that matters should be free from control? Without hesitation and little fear of contradiction I say yes to the first question. A casual glance at insolvency proceedings serves to confirm this assertion. True it is that misfortune often takes the leading part in ruining one's prospects, but I venture the opinion that by far the greater number of failures in farming practices is due to lack of organisation. As in all other propositions, a farm properly conducted is almost invariably sure to bear satisfactory results. Success does not depend so much on the amount of labor contributed as the manner in which the work is accomplished. In the earlier period of Pinnaroo as a farming district large areas were cropped and highly payable results obtained with but slight attention to cultivation. Who of us would for a moment harbor the thought of seeding similar to the procedure of those early days? Those concerned with agriculture are awakening to the fact that the man of business ability has a long pull over his friends who may be lacking in that respect.

A time there was when it was considered that anyone not possessing the full qualifications as an inmate of a mental home could make good on a farm. That theory has long since been exploded, at any rate, in so far as concerns the general control. It is a freely admitted truth that farming of to-day is not what it was, say, 20 or 25 years back. Certainly science has been a great factor in improving the methods, but were it not for the educational facilities afforded, who of us could grasp the meaning of a lot that has been put in the way of the present day agriculturist. And just here I would pay respect

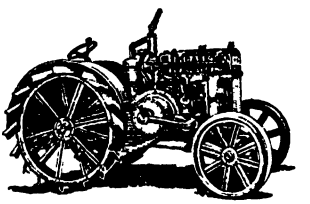
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to those pioneers of our State. Many there were who could not write their names, and to read was an unknown blessing. There were no experimental stations to guide them, yet by patience, grit, and hard work they plodded along for the benefit of us who were to follow. To what extent is the farmer of to-day availing himself of assistance that was not possible to the early day producer? Given all the advantages of educational facilities and scientific work, has the farmer advanced to that pinnacle that opportunities demand?

An inspection of not necessarily a large area would, I think, be convincing evidence that in business practices he has not kept pace with the times, and this in spite of all I have written that is in his favor. How, then, is the desired improvement to be brought about? To solve the problem I would advocate not quite so much guesswork and subsequent trust in luck, but a more careful and systematic process in all our operations. The many loose methods of the producer would not be tolerated by a commercial house of any standing; there nothing is left to haphazard methods. As an example, take the merchant when he sells you an article. You are asked to sign a sale note, but to any who have taken the care to make known the terms of the sale it is clearly apparent that he (the seller) takes no chance.

It must be readily admitted that the duties of a farmer are most complicated. He cannot employ various assistants who are experts in their own line, as is the case with the mercantile firm. The responsibility of finances, markets, correspondence, and general control of the various farm operations falls to the one individual. Climatic conditions, market fluctuations, our old enemy "Take-all," and various other drawbacks offer quite sufficient I should think by way of speculation, for after all said and done our task is practically a gamble.

If we are agreed that to be methodical is one of the pointers to prosperity, let us consider for a while just how far we fall short in our object. I do not desire to be presumptuous, but perhaps you will permit of my outlining a few of the main factors (in my opinion) essential to general farming pursuits. It may be a case of "Don't do as I do, do as I tell you." The district in which I am working having proved itself most adaptable to mixed farming—I refer mainly to cereals and wool, and do not lose sight of the fact that there are other side lines which can be, and are, turned to profitable account—I would emphasise the advisability of not having all your eggs in the one basket. Likewise, too, it is not wisdom to have too many baskets to be filled, as some may possibly, to a disadvantage, be neglected for the benefit of others. Grain growing and wool and sheep raising can to advantage be worked together, and neither govern the other in so far as control of prices is concerned.

Book-keeping.

To know whether the farmer is working at a profit, or otherwise, he must be aware of his financial outlay, and, if this expenditure is not returning a reasonable rate of interest, he is forced to the conclusion that his venture is not a prosperous one. He must, therefore, devise a means whereby the state of his finances is clearly defined.

In many instances—I might almost add in most cases—the farmer's set of books is formed with a cheque book and bank pass book. These volumes should contain most valuable information, but at the best divulge nothing beyond actual cash transactions by way of earnings and disbursements. Every farmer should have some more detailed form of book-keeping. Even had I the ability to deal with this item on a strict accountancy principle I realise the impossibility of it being carried to effect. Few of us on the land have the inclination, much less the time, to devote to such a complete system. But I do think that we should have a cash book, journal, and ledger. By this means we could have a true and detailed record of all transactions. Do not trust to memory, because if your mental carrying capacity is not above the average you stand a good chance of slipping, besides it is not method. Keep a rough book and make a note therein, and this can be entered in its proper place as time permits.

At the end of every 12 months a balance-sheet should be prepared, setting forth all earnings and expenses, either cash or credit, together with a list of all stock, *i.e.*, livestock, machinery, harness, and the sundry other items on hand, such as hay, grain, &c. By some such procedure as that which I have outlined one can at a glance take in his actual position. It is a good plan to make the financial year end so as to coincide with the taxation returns. Make all payments by cheque. This does not necessarily signify that each individual account is met with a separate cheque. When there are several small accounts, group them together, taking care to include full details in cheque book heel. All receipts should be paid to the bank. The process of paying one's various liabilities from money received for settlement of an account, besides being far from correct, is liable to lead to confusion. If these two forerunning hints are enforced and a daily record retained of business transactions on credit, then to keep an account of the year's finances is but a simple matter. Make out all cheques to the order of payee, and preferably cross them with the words " Not negotiable." This precaution minimises the risk should a cheque go astray.

If you are so fortunate as to be in that happy position, do not run a huge credit with your banking institution. The money lying idle there should be converted to some revenue producing source. To the man who thinks and keeps well in touch with current happenings it is advisable rather to have an overdraft, for those who properly conduct their business can almost invariably secure a better return for their money than is charged by banks as interest. Do not misunderstand me, for I realise that to be carrying a heavy mortgage is no pleasant position, and for the one so placed it means an uphill battle.

Horses.

For the time being horse flesh is the main means of locomotion on the farm, and I admit the probability of the tractor in the near future being found suitable for many operations. It is well to get the fact firmly established in your mind that it costs no more to keep a good horse than it does to sustain an inferior one. Has it ever dawned on you what is the additional upkeep and loss of time consequent upon

having, say, 10 horses to do the work of eight? There is the extra feed consumed, additional harness, and extra labor in grooming and yoking. Just here let me make myself clearly understood. I am no advocate of the common practice of expecting eight horses to accomplish that which is the work of 10. If there were less in the way of overweighting the team and more attention paid to proper feeding, grooming, and fitting of collars, I am convinced that that almost sickening sight of sore shoulders would be considerably reduced. Feed your horses regularly four times a day and give just that quantity which they will consume in the one meal. If you want a scratching area for your fowls, do not let that place be the manger. I have more than a hazy idea that fowl dung is no more palatable to the horse than it is to the human.

Machinery.

This brings us to one of the heaviest items of expense on a farm, for one must keep abreast of the times. It does not pay to be using a 6ft. machine where one of 8ft. can be satisfactorily worked. Two additional feet in a round at harvest time is a lot. I am not going to further weary you by quoting figures, so work it out for yourself and see the saving. Many years ago, in discussing Bureau work with a former Secretary of the Advisory Board, I quite agreed with him when he said that in arranging a syllabus there were many vastly more important topics than to tell each other of the need to paint machinery. I then held the opinion, and still retain it, that paint is put on wood for a purpose, and the good it serves is not solely to add to the appearance of the implement. A casual glance at the attention paid to machinery on many holdings fills one with amazement at the idea of such valuable property being neglected to the extent that it is. Not every farmer is so fortunate as to have ample shed room, but if you go into the question it will be found that the erection of a brush shed is not a very costly affair. Such a building is not without its faults, but, as the seafaring man says, "Any port in a storm." It is a good plan during the working of an implement to make a note —not only a mental one—of any repairs which may be necessary, and see to it that these defects are remedied before next season. A job in the shop is worth two in the paddock. Another good point to be remembered is that lubrication is usually cheaper than new parts. Do not wait until the need for oil to a bearing is made audible. Be cautions in your purchase of new machinery. Many farmers have the habit of buying an implement solely on the merits of its maker, and, as a consequence, are often left with an implement, which is quite unsuited to local requirements. If you have the inclination to second-hand machinery—I have not as a rule—then be doubly cautious. The purchase of this class of implement has often been the cause of many regrets. When the other chap has something in this line to quit you can depend on it that he has some reason for effecting its disposal, so be most careful in your examination, and so minimise the risk of losing a lot of time, labor, and cash in remedying faulty parts.

Insurance.

It is surprising to learn the number of farmers who incur quite unnecessary risks. More than once I have been told that they act as their own insurance company. Such a procedure may not be bereft of good points, but I question its wisdom and venture the opinion that it is a wise man who allows some company, formed for the purpose, to accept the responsibility. By all means, with the aid of firebreaks, etc., guard against the risk of a fire, but do not overlook the possibility of a conflagration starting within those boundaries. For my way of thinking the practice of smoking in paddocks of ripe wheat and stubble is far too common. No, if betting were legal, I would be prepared to wager that I get as much comfort from my pipe as the other fellow, but I hate the thought of the possibility of burning out my neighbors.

Planning Sheds.

The matter of arranging the position of various outbuildings is one which calls for deep thought. Not so very long ago I saw a publication—I forget the article—which set forth a plan of the sheds practically all under the one roof. This idea has the advantage of being less costly, and no doubt is convenient for general working purposes. I wonder if those who advocate such a building have considered the possible and probable result should a fire break out in that shed.

Cultivation.

Due respect must be paid to proper cultivation, &c., but as this is a subject sufficiently important for a paper to itself I purposely refrain from making a lengthy comment, and content myself by saying that this operation is most important if we are hopeful of success. Look well ahead, do not wait till it is time for the ploughs to be at work before you decide where you will fallow, and because a paddock is handy to the homestead is no reason why it should be continually under crop.

Overstocking.

It seems to be quite a common practice to make use of the feed in spring time, while there is abundance, with little thought for autumn provision. I know the temptation to have a large wool clip, especially so in these times of high prices. But I would far rather have a paddock of feed to spare and learn later that it would not be required than to be faced with a need of it and not have it. It is no mistaken policy to keep on hand a supply of fodder to last over a long period. At least a quantity to carry over 12 months ahead should always be in store, and for preference I would have sufficient for two years. It certainly seems a lot of money to remain idle, but, as I have previously mentioned, farming, to a large extent, is a gamble, so why take unlimited risks? We have had droughts, and there is no justification for the thought that they will not again appear. To purchase fodder in such times would absorb an amount far in excess of what you would be losing in interest on the valuation of a haystack or two.

Time.

Try and realise that your time is valuable; far too costly to be wasted at such periods as seeding and harvest operations. I do not suggest that one must necessarily rise early and retire late When once a job is started make every effort to get it finished before starting another. To say nothing of the confusion, there is much lost time when there are several works in hand at once. If there are sheep to be crutched see to it that it is performed before you start your harvester, and do not leave the drill idle while you return a borrowed boar. If such things must be done in the busy period get somebody else to do it, not the man on the machine. Keep an eye on those round about you if they are making a success; follow their lead or try and go one better. Friendly rivalry is a great stimulant to improvement. A man can become very narrow in his views by confining himself solely to his own doings. Because our ancestors performed work in a particular way is no argument that the method is beyond improvement.

Labor.

If you are the employer of labor treat your hired men with respect and in such a way as would suggest that you recognise them to be of a making similar to yourself. Do not encourage too much familiarity, as you thus displace your position as ruler. See to it that he adapts himself to your methods. Because Mr. So-and-So, for whom he last worked, had a particular way of doing certain jobs is not to say that it should be performed in a like manner on your farm.

If this ordeal has not been too wearying I have transported your thoughts across a wide area, and maybe I have wandered from the beaten track. If I have failed to keep up the standard of literary efforts, I trust that some of the points raised will be the cause of an interesting discussion. In conclusion, I would add that as a means of advancing our position as an agricultural calling, adopt a system, be progressive, be cautious, and above all be straightforward in your dealings.

Discussion.

Mr. J. Hannigan (Wilmington) said he would like to lay emphasis on the necessity for insurance, and quoted instances where failure to insure resulted in serious losses. Mr. L. Hussey (McLaren Flat) agreed with the views of the writer regarding the feeding of stock. Horses needed regular feeding with good clean feed. Poultry, he thought, were a great asset on the farm, but they should not be allowed access to the stable. Mr. J. Davidson (Mt. Schank), said a careful account of all the operations connected with the farm should be kept. Leaving the machinery out in the weather would do more damage to it than several seasons work. Some of the principles advocated by the writer of the paper would not be applicable to the lower south-eastern portion of the State. Mr. A. Anderson (Morphett Vale) was in favor of keeping only the best type of horse which should be well fed and cared for. Also, a careful record of all the farming operations was essential. Mr.

T. Gardner (Koppio) referred to the necessity for preserving fodder for lean years. He thought farmers should consider the wisdom of storing surplus fodder as ensilage, because haystacks deteriorated through weather and mice. Mr. G. C. Jackson (Glossop) stated they were often unable to obtain veterinary assistance other than through the Government, and they frequently had to pay exhorbitant prices for drugs, &c He suggested that the Advisory Board should obtain the drugs at wholesale rates, for the Agricultural Bureau Branches. Mrs. Hammatt (Williamstown) said that a covering of wire-netting could be placed over the manger to keep out the fowls, or another method was to use nosebags on the horses.

THE RAISING OF FAT LAMBS FROM MERINO AND MERINO-LONGWOOL EWES.

Mr. R. C. Scott, (Experimentalist), Roseworthy Agricultural College), then read the following paper on this subject:—

Lamb raising is a separate branch of the sheep industry which comes well within the reach of the average farmer. Owing to the steady rise in land values it is evident that the times are past when South Australian farmers could confine themselves exclusively to the raising of grain. This, together with the price of lamb to-day, makes the industry worthy of the most serious consideration. In support of the proposition we have the fact that the raising of a lamb which matures rapidly and whose body attains the desired weight and primeness before weaning, is eminently suited to the majority of our wheat growing areas with their relatively short period of succulent pasture and with fallowing operations steadily reducing the available grazing fields.

Further, sheep on a farm not only act directly as a source of revenue but indirectly also, to the extent that they assist ordinary farming operations by enriching the land with their droppings, thus maintaining the soil in the highest state of fertility; keep down undesirable weeds and compact land that is at all loose and open. On the whole it is in those districts in which wheat growing can be most profitably carried out that lamb raising is most practicable, yet distance from the railway and transport difficulties generally, are factors which have to be considered. As we shall see later on, lambs very quickly decrease in weight and lose their bloom when separated from their mothers, and it is therefore obvious that for best results slaughtering should take place without delay. This fact contributes considerably to the good general appearance of New Zealand export lambs. There depots are generally within handy reach and the lambs may be slaughtered within a few hours of leaving their mothers.

Farmers' Flocks Increasing.

That the farmers of this State are not altogether unaware of the possibilities of sheep on the farm may be noted from the following table of South Australian statistics.

Table I.—*Showing the number of flocks and sheep held in flocks of under* 500 *sheep, comparatively with those held in flocks of* under 1,000.

Flocks.

Year.	Under 500. No. Flocks.	Per Cent. to Total.	Under 1,000. No. Flocks.	Per Cent. to Total.
1917-18	6,886	74.64	8,174	88.60
1918-19	7,268	74.04	8,723	88.86
1919-20	7,790	78.18	8,983	90.15
1920-21	7,772	76.95	9,060	89.70

Sheep.

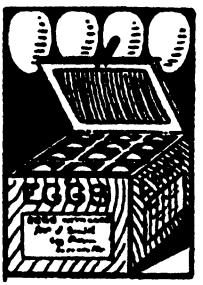
Year.	In Flocks of Under 500. No.	Per Cent. to Total.	In Flocks of Under 500. No	Per Cent. to Total.
1917-18	1,273,876	20.45	2,176,756	34.94
1918-19	1,398,885	21.11	2,408,173	36.34
1919-20	1,356,954	22.56	2,188,498	36.39
1920-21	1,303,465	20.49	2,221,008	34.92

Assuming that the average farmer's flock consists of under 500 sheep then these figures indicate that there has been a steady increase in the number of farmer sheep holders up to 1920 with a slight decrease the following year. Approximately 20 per cent. of the sheep in the State are held in flocks of under 500 and 35 per cent. in flocks of under 1,000. A fair estimate seems to be that about a third of the total sheep in South Australia are held by farmers and that about nine-tenths of the sheep owners combine both cropping and grazing. Therefore there is abundant scope for the fat lamb industry which is most successful on comparatively small areas where the flocks may be kept under constant observation. We may now proceed to discuss the advantages and disadvantages associated with the raising of fat lambs.

Marketing Facilities.

In the first place we have to consider the facilities for marketing the produce. Some localities are so far distant from the saleyards at the Metropolitan Abattoirs or the Government Produce Depot that the lambs consigned to them have to spend considerable time in transit and therefore come before the buyers wasted and lacking in bloom. In consequence sellers are compelled to accept reduced values. In such districts the lack of facilities for marketing lambs in a fresh state compels the farmer to regard the wool yield of the ewe as being, at any rate, of equal importance to the revenue derived from the lamb. For those who are within a reasonable distance of meat works, however, the lamb will always constitute the chief source of profit.

EGGS NOW—BUT WHAT ABOUT NEXT WINTER?



Next Winter is the time in which you should bend every effort to make your Poultry Keeping venture a success. Eggs will be scarce, prices will be high, and though you might think your profits satisfactory now, they will be quickly swallowed up in a few weeks if you are forced to feed hens which will not lay. By commencing to feed your birds on 'KARSWOOD' Poultry Spice NOW, you enrich the blood, tone up the system, and put each one in the vigorous, energetic health, that will enable them to come quickly through a thorough moult and on to lay again when eggs are scarce in other poultry yards. *There's* your profit. Read this letter, typical of hundreds such, and decide to start to-morrow.

"Rockford Road,
Tahmoor, N.S.W.,
January 9th, 1922.

Dear Sir—I hope I shall now be able to forward more consignments, as I find 'KARSWOOD' Poultry Spice assists the fowls through their moult, and brings them on laying much quicker. I am sorry I was short of this Spice last month, but hope to keep it up to them in future.

(Signed) C. E. CARTER."

Mr. Carter but voices the experience of half a million other users. You, too, can have these good results.

NOTE THE ECONOMY.

One tablespoonful (½oz.) of

'KARSWOOD' POULTRY SPICE

(Containing Ground Insects)

Is sufficient for 20 hens for one day; so that it costs you less than a ½d. a day for every 12 birds.

1s. packet (¼lb.) supplies 20 hens 16 days.
2s. packet (1lb.) supplies 20 hens 32 days.
13s. tin (7lbs.) supplies 140 hens 32 days
14lbs. tins, 25s. 28lbs. tins, 48s.

Makes 12 Hens Lay for ½d. a Day.

MAKE A TEST.

Get a 1s. packet of 'KARSWOOD' Poultry Spice from your local storekeeper, grocer, or produce dealer, try it for a fortnight on half a dozen hens. Do not expect immediate results. 'KARSWOOD' works NATURALLY, it does not force, it takes a fortnight or three weeks to show results, but they are good and sure. If your local dealer cannot supply you, drop a postcard either to the agents for your State (address below) or to 'KARSWOOD,' Box 2138, G.P.O., Sydney, and you will be put in touch with your nearest suppliers.

SOUTH AUSTRALIAN AGENTS—

S. C. EYLES & CO.,

CURRIE ST., ADELAIDE.

NOTE—If supplied by Wholesale Agents direct, postage must be added to cost.

Fencing and Feeding.

Fencing is an important item. When sheep are confined to small fields even the merino is likely to creep through at certain times of the year and the flock becomes a constant source of danger to crops unless sound sheep-proof fences have been erected. Adequate water supplies are necessary and shelter of some kind in bleak fields is a decided advantage to lambing flocks.

Finally, the farmer who wishes to stock up to his fullest capacity must be prepared to handfeed and raise such fodder crops as can be grown in his district in order to carry the flock through a dry period.

The College Flock.

Bearing upon the carrying capacity of a wheat raising farm, where due care is taken in the management of the lamb breeding flock, the following data obtained on the College farm may be of interest.

Table II.—*Showing the number of sheep kept on the College Farm between* 1912 *and* 1922 *and their relation to the arable and grazing area of the farm.*

Season.	Arable and Grazing Area.	Area under Cereals and Bare Fallow.	Average No. of Sheep kept throughout the Year.	Average No. of Sheep kept throughout the Year per Acre of Arable and Grazing Area.
	Acres.	Acres.		
1912-13	1,755	1,335	1,254	0.71
1913-14	1,760	1,220	1,226	0.70
1914-15	1,760	1,353	924	0.52
1915-16	1,760	1,332.5	731	0.54
1916-17	1,760	1,141.3	928	0.53
1917-18	1,760	1,115.4	1,001	0.57
1918-19	1,760	1,190.4	1,092	0.63
1919-20	2,096	1,421.7	1,230	0.59
1920-21	1,909	1,327.7	1,126	0.59
1921-22	1,909	1,324	1,149	0.60
Mean for 10 years	1,823	1,276	1,066	0.60

From this table it is to be noted that the sheep carrying capacity of the College farm is three-fifths of a sheep per acre over the whole area.

During the four or five months of the year when the ewe is suckling her lamb the flock practically doubles itself and corresponding with the decline in the amount of natural feed it sinks again as the lambs are disposed of. As has already been referred to, this condition of affairs fits in well with ordinary tillage operations, particularly in our lower northern areas. Now-a-days no difficulty is likely to arise with regard to the disposal of lambs for their value is to a certain extent governed by the markets of the world. In South Australia the lamb market has to cater for both the local and export trade with the result that early spring lamb usually commands prices much above export rates, but during the flush of the season prices approximate to overseas values. However Abattoirs' prices, now that the export trade

has become fairly established, are less liable to serious fluctuations, and is is recorded that the average price per head for lamb in that market during the last six seasons is represented by the sum of 25s. 4d. Generally speaking, the bulk of the export lambs of this State are sold in the open market and purchased under the hammer by meat exporting firms. This is, however, not the only means open to the farmer for the disposal of his lambs, for he also has the option of forwarding direct to the Government Produce Depot. The following information has been received from that department, setting out the conditions under which they treat for export and sell lambs direct from producers.

Sale on Consignment.

The Department will pay on producer's account:—(1) Railage to works, also order trucks; (2) Slaughtering and freezing charges, 1d. per lb.; (3) Freight to England, 1⅞d. per lb.; (4) London charges approximately ¾d. per lb. This is equivalent to an over-all charge of 3¼d. per lb.

The Department financially assists producers by making them an advance in cash, less the over-all charges above referred to, of 75 per cent. of the London value at the time of shipment, which is later deducted from their account sales. This advance is free of interest.

As an example—If the London market was quoted at the time of shipment at 9d. per lb for Australian lamb the producer would actually receive in cash immediately:—

75 per cent. of 9d. per lb.—6¾d. per lb.
Less over-all charges paid—3¼d. per lb.
Cash advance—3½d. per lb.

Assuming an average weight of 33lbs. per lamb the cash received immediately by the producer would be:—

33 lbs. at 3½d. per lb.—9s. 7d.
Value of skins (say)—3s. 11d.

Total—13s. 6d.

The skins are delivered to whatever agent the owner stipulates and the agent pays the owner direct. When the lambs are sold in London and the account sales are received, a copy of same is forwarded to the owner, together with a cheque for the balance of the proceeds. To cover the cost of this work, including the selling commission in London, 4 per cent. commission is charged by the Department. The London market prefers lambs of from 30lbs. to 37lbs. dressed weight.

It may not be generally known in connection with this system of marketing that the vendor of even small consignments reaps the benefits that accrue from a proper system of grading since all the lambs slaughtered on consignment are classified into the various grades whilst on the hook and shipped accordingly.

The Best Cross.

In setting out to raise fat lambs the first question to decide is, what is the best cross to adopt in order to secure early maturity and the aptitude to fatten at a given weight. This latter point is important, as

prime lambs, not too heavy, are the best suited to the export trade. Opinions vary considerably as to which breed or cross best fulfils these conditions, and it was with the object of supplying reliable information on the subject that experiments in connection with fat lamb breeding were instituted at Roseworthy Agricultural College by the Principal (Mr. W. J. Colebatch, B.Sc., Agric., M.R.C.V.S.). The writer has been associated with him in this work and in submitting the results so far obtained wishes it to be clearly understood that the experiment is still in its infancy. The results quoted represent at the most but three years' work, and therefore cannot yet be regarded as conclusive.

At the outset the test was confined to half-bred longwool ewes, but this year has been extended to embrace the Merino. The choice of half-bred ewe lay between the half-bred longwool and the half-bred shortwool, and as the fleece of the latter is short, light, and less valuable, the former cross was adopted. Four strains were secured by mating the Merino ewe with the longwool sires common in South Australia, namely Lincoln, English Leicester, Border Leicester and Romney Marsh. The Lincoln and Romney Marsh Merino ewes have been bred on the farm from large-framed strong constitutioned Merino ewes by good flock rams obtained from the Lincoln stud of Mr. W. Grundy, and the Romney Marsh studs of Messrs. Feuerherdt Bros. and Davidson Bros. Until this season the English Leicester and Border Leicester Merino ewes were secured in annual drafts from Mr. W. S. Kelly and Mr. O. S. Roberts respectively, but in the future all the half-bred mothers will be bred on the farm.

Since 1921 these strains of half-breds have each been mated with Dorset Horn, Shropshire, and South Down rams which are the Down sires commonly used in South Australia, noted for their early maturing qualities, shape of carcass, and prolificacy. Under this plan of mating twelve types of crossbred lambs were obtained. This season the Merino ewe has been brought under test and has been mated with the four longwool rams and the three Down rams above referred to. Thus at the present time nineteen breeds of lambs are being subjected to trial under conditions as near equal as possible.

The Ewes.

In connection with the choice of ewe, speaking generally, South Australia is not in a position to adopt the half-bred altogether, as in the first place that class of sheep is difficult to purchase; and secondly, the average farm fence is not good enough to hold her. There can be no question that cross-bred ewes are better mothers and rear their lambs well, but at the present time the choice of Merino ewe is more or less obligatory. Big framed northern Merino ewes are practically always obtainable, and although the object is to raise an export lamb, yet the wool of the ewe is of importance. In this connection sight should not be lost of the fact that when the ewe has to suckle a strong rapid growing lamb she is not likely to produce the same quality fleece as when rearing the slower-growing Merino lamb. Additional weight of fleece can be expected from the half-bred longwool ewe and although the price of wool fluctuates the total value rarely attains to that of the Merino. The Merino being a smaller framed sheep, eats

less than the crossbred, and in consequence a greater number of sheep per acre could probably be carried, although it is generally conceded that the crossbred is a better forager, not so particular as to quality and recovers more quickly after a hard time.

As the Merino ewe has but recently been admitted to the experiment the relative merits of the Merino and half-bred ewe have not been investigated for sufficient length of time to warrant the expression of confirmed opinions based on experimental data. It remains to be seen in later years whether the advantages of the Merino above enumerated are sufficiently weighty to make up for the extra clip of wool, better mothering qualities, higher lambing percentage, greater value of the lamb combined with the additional price that the half-bred longwool ewe is likely to bring in the market after her days in the lamb breeding flock are finished.

The Sires.

Of the sires that are available we have the two classes, namely, longwools and shortwools. In this State the former are represented by Lincoln, English Leicester, Border Leicester, and Romney Marsh, and the latter by Dorset Horn, Shropshire, and South Down. The shortwools are also known as Downs, and to that section may be added the Suffolk and Hampshire Downs, which, although not common with us, are very popular in some parts of the world, and no doubt will eventually be tested in Australia. The Lincoln is probably the most popular of the English breeds of sheep. It is the largest sheep of its class and cuts the heaviest fleece.

The English Leicester is noted for symmetry of form and evenness of carcass. The Border Leicester is one of the most popular of the British longwools possessing particularly good loin and forequarters. The Romney Marsh is an extremely hardy sheep famed for its resistance to diseases of low-lying country. The Dorset Horn is a shortwool breed of growing popularity which imparts very early maturing qualities to its lambs. The Shropshire is noted for early maturity and symmetry of body. The South Down is the oldest of the British breeds and holds the premier position amongst all breeds for quality lamb and mutton. Of the other Downs occasionally met with the Suffolk resembles the South Down in many respects, but is larger and proportionately longer in the leg. The sires are extremely vigorous. The Hampshire is a clean dark faced sheep with strong roman nose; larger, stronger boned, and coarser sheep than Shropshire. The half-bred ewes being used in the test resemble one another in that they possess big frames and strong constitutions. Some of the most typical characteristics are:—The Lincoln ram on the Merino ewe gives a large sheep, even in outline, bluish face, carrying a small topknot of wool. The English Leicester-Merino is rather smaller than the others, being shorter bodied but having square well rounded quarters. The face is bluish and the wool finer than the Lincoln.

The Border Leicester-Merino carries the finest type of fleece; is a large sheep, with long broad back, deep well-sprung ribs and good loin. Perhaps the most typical characteristic is the tendency towards a long Roman nose whitish in color. The Romney Marsh-Merino is a

comparatively loosely built sheep, being wide on the loins, with high, rather narrow forequarters. The bone is coarse, the face short and broad, and the fleece approaching that of the Border Leicester in quality. The Merino ewes comprise a fairly uniform flock built up by purchases from "The Gums," "Koonoona," and "Neath Vale" Stations, together with a few bred on the place, of Canowie strain.

Mating.

In connection with the general handling of the flock, all ewes have been regularly joined with the rams during the last week of November. They remain with them practically two months, being withdrawn towards the end of February. Rather more than 2 per cent. of rams are used, whilst an extra sire is usually added during the last two or three weeks. Restriction in the number of sires is false economy in a fat lamb breeding flock. During lambing time the ewes are visited at least once a day and the lambs tailed with the searing-iron when about three weeks old. However, this depends on the weather, for a bright sunny day is preferred for the operation. After tailing, the various flocks are grouped according to the mother of the lamb. Thus we have five main flocks which are frequently moved from one field to another in order to even up the feed conditions as far as possible.

In computing the age of the lamb it has been decided that May 11th. is a fair basis for commencement, as although the first lambs appear towards the end of April, the greater number are dropped during May. Thus at the time of the first weighing after tailing (August 4th) the lambs are regarded as being twelve weeks of age. At birth the average lamb from a Merino ewe weighs about 7lbs. whilst that from a cross-bred ewe weighs about 8lbs. These weights have been deducted from the totals when averaging the increase in weight per day over the life of the lamb. No concentrated food is fed to them and they simply graze at large on natural pastures.

Table III.—*Showing the average weights and daily increases, of lambs obtained from Merino ewes, season* 1923.

Lamb.		Weight when Tailed. Lbs.	Weight at 12 Weeks. Lbs.	Increase per Day. Lbs.	Weight at 14 Weeks. Lbs.	Increase per Day. Lbs.	Average Increase per Day. Lbs.
Long Wool Halfbred.							
Sire.	**Dam.**						
Lincoln	Merino ..	26.01	46.25	0.42	52.46	0.44	0.46
English Leicester	Merino ..	17.44	47.09	0.45	54.47	0.53	0.49
Border Leicester	Merino ..	19.71	40.63	0.35	46.91	0.45	0.41
Romney Marsh	Merino ..	19.78	46.70	0.40	53.21	0.47	0.47
Means		20.74	45.13	0.41	51.76	0.47	0.46
Short Wool Halfbred.							
Sire	**Dam.**						
Dorset Horn	Merino ..	22.52	51.27	0.48	61.61	0.67	0.56
Shropshire	Merino ..	24.08	56.08	0.53	64.38	0.59	0.58
South Down	Merino ..	13.17	47.27	0.57	55.73	0.60	0.50
Means		19.92	51.54	0.53	60.57	0.62	0.55

These figures represent but the result of one year's work and therefore are by no means conclusive. It will be contrary to other experiments of this nature if in future years we do not find the Border Leicester half-bred occupying a higher position amongst the longwools. Both this cross and the lambs by South Down were dropped relatively late in the season and have not been able to regain that handicap.

The following points are of interest:—The lambs sired by the mutton breeds (the shortwools) have matured much more rapidly, showing a greater increase in weight per day than those sired by the longwools, even the slowest maturing, the South Down, being ahead of any of the half-bred longwool lambs. The half-bred English Leicester lamb has shown the greatest weight and increase per day in its class, whilst the Shropshire is at present ahead of the Dorset Horn. However, during the fortnight between the 12th and the 14th week, the latter were increasing at the rate of .67lbs. per day, as against .59lbs. for the former. It would appear, therefore, as if the Dorset Horn will later on outrival the Shropshire.

The Half-bred Longwool-Merino Ewe.

Table IV.—*Showing the Average Fleece obtained from Half-bred Longwool-Merino Ewes comparatively with that obtained from the Merino*, 1920-22.

Year.	Lincoln-Merino.	English Leicester-Merino.	Border Leicester-Merino.	Romney Marsh-Merino.	Merino.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1920	9.42	8.89	9.48	8.84	9.69
1921	12.53	11.45	11.80	11.11	9.81
1922	12.70	10.86	10.67	11.47	12.60
Means	11.50	10.40	10.65	10.47	10.70

From the half-bred longwools the highest average weight of fleece has been obtained from the Lincoln-Merino ewe, followed by the Border Leicester-Merino, while the Romney Marsh and English Leicester-Merino are approximately equal. At 1921 shearing the Merino average was materially assisted by weighty fleeces from four-tooth Koonoona and Neath Vale ewes, with the result that the general average was raised, and is now ahead of all except the Lincoln-Merino. In our district we are liable to suffer reduction in wool values owing to foreign matter such as sand and burr; moreover the fibre is apt to be strong, and is sometimes lacking in the lustre characteristics of the wool of cooler districts.

The following table gives some idea of the lambing percentages to be expected under average conditions.

Table V.—*Showing Lambing Percentages from Half-bred Longwool-Merino Ewes by Down Rams. Seasons* 1921-1923.

Ewe.	Year.	Ram. Dorset Horn. Per cent.	Shropshire. Per cent.	South Down. Per cent.	Means. Per cent.
Lincoln-Merino	1921 ..	93.18	83.72	79.07	85.32
	1922 ..	80.00	82.98	100.00	87.66
	1923 ..	90.63	74.20	103.27	89.37
	Means ..	87.94	80.30	94.11	87.45

TABLE V.—*continued.*

Ewe.	Year.	Ram. Dorset Horn. Per cent.	Shropshire. Per cent.	South Down. Per cent.	Means. Per cent.
English Leicester-Merino	1921 ..	65.22	77.78	71.11	71.37
	1922 .	80.49	87.80	60.98	76.42
	1923 ..	100.00	90.32	87.10	92.47
	Means ..	81.90	85.30	73.06	80.09
Border Leicester-Merino	1921 .	82.50	69.05	82.93	78.16
	1922 ..	90.90	88.37	97.67	92.31
	1923 ..	100.00	112.50	96.88	103.13
	Means .	91.13	89.97	92.49	91.20
Romney Marsh-Merino	1921 ..	78.57	69.77	78.57	75.64
	1922 ..	87.50	76.74	83.30	82.52
	1923 ..	84.85	71.88	109.38	88.70
	Means ..	83.64	72.80	90.43	82.29
	Mean Total	86.15	82.09	87.52	

These figures represent the percentage of lambs marked to ewes mated. It will be observed that the Border Leicester-Merino ewe has been the most fertile, producing a mean percentage of 91.20, followed by the Lincoln-Merino, 87.45 per cent.; Romney Marsh-Merino, 82.29 per cent.; and English Leicester-Merino, 80.09 per cent.

Dealing with the prolificacy of the rams, it is noted that the South Down has left the highest percentage of lambs. The Dorset Horn is very little inferior in this respect, but the percentage gained by the Shropshire is appreciably lower. Taking the crosses individually, the Lincoln-Merino, when mated with the South Down, has produced the greatest number of lambs, and the Romney-Marsh-Merino to Shropshire has yielded a comparatively low percentage of 72.89.

N.S. WALES RESULTS.

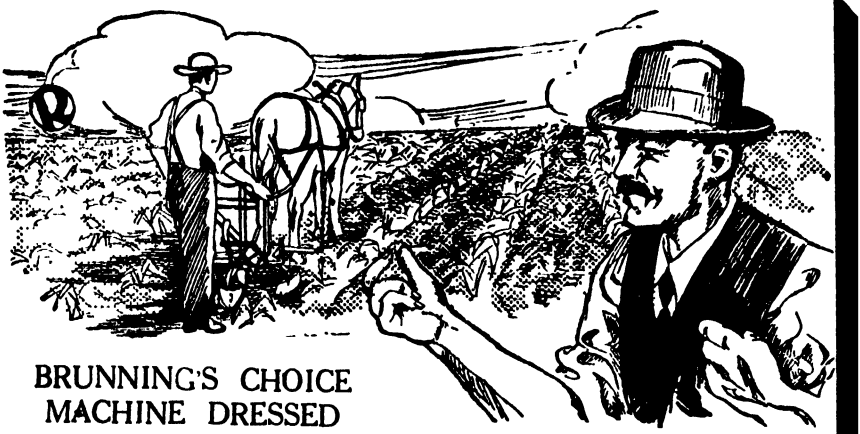
It will be interesting to compare these results with those obtained by Mr. J. W. Mathews, late Sheep and Wool Expert of New South Wales. In similar experiments carried out in that State, as a result of seven years' work, he found that the mean fertility of the Border Leicester-Merino Ewe to be 83 per cent.; Lincoln-Merino ewe, 78 per cent.; and English Leicester-Merino ewe, 77 per cent. In the same experiment, prolificacy of the rams worked out as under:—South Down, 80 per cent.; Dorset Horn, 76 per cent.; Shropshire, 74 per cent.

LAMBING DIFFICULTIES.

No records have been kept with regard to assistance during lambing, but it was only occasionally that any help was needed. Speaking generally, no difference was noticed between the breeds of ewes in this respect, but as regards rams most difficulty was experienced with lambs by Shropshire, followed by Dorset Horn, and lastly by South Down.

DEVELOPMENT OF LAMBS.

All lambs are weighed at tailing, during the first week of August, and fortnightly from then onwards. At the time of the second weighing, for comparative purposes they are regarded as being an average



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A most useful article of diet for cattle, sheep, and pigs. Can be used as the fruits mature through the Summer and Autumn, and the remainder stored for Winter and early Spring feed.

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age of 12 weeks. When 14 weeks old there are almost always some lambs of marketable weight, and the disposal of these as they mature must inevitably affect the average of later weighings. For that reason the average weights of lambs can only be shown up to the fourteenth week. To obtain the average increase in weight per day, as shown in the last column, a sum of 8lbs. has been deducted from the total weight as representing the average weight of the lamb at birth.

TABLE VI.—*Showing the Average weight at tailing, 12 weeks and 14 weeks, and average Increase in Weight per Day of Lambs obtained from Half-bred Longwool-Merino Ewes by Down Rams. Season* 1921-1923.

Lambs by Dorset Horns—

Dam.	Year.	Weight at Tailing.	12 Weeks.	14 Weeks.	Average Increase per Day.
		Lbs.	Lbs.	Lbs.	Lbs.
Lincoln-Merino	1921 ..	—	59.57	68.20	0.61
	1922 .	28.43	70.22	76.17	0.70
	1923 .	24.77	66.10	76.82	0.70
	Means	26.60	65.36	73.73	0.67
English Leicester-Merino	1921 .	—	63.48	72.09	0.65
	1922	19.38	61.22	69.93	0.63
	1923 ..	21.65	57.51	64.35	0.59
	Means	20.51	60.74	68.79	0.62
Border Leicester-Merino	1921	—	75.50	84.30	0.78
	1922 ..	23.00	65.00	72.87	0.66
	1923 ..	23.37	66.47	76.34	0.70
	Means	23.19	68.99	77.83	0.71
Romney Marsh-Merino	1921	—	62.93	70.72	0.64
	1922 .	25.37	57.19	63.26	0.56
	1923	23.46	59.22	65.15	0.58
	Means .	24.42	59.78	66.38	0.59
Lambs by Shropshire:—					
Lincoln-Merino	1921	--	54.25	60.42	0.53
	1922 .	23.24	61.32	68.54	0.62
	1923 .	19.04	59.81	68.91	0.62
	Means .	21.14	58.46	65.96	0.59
English Leicester-Merino	1921 ..	—	49.61	57.09	0.50
	1922 ..	17.60	54.41	62.97	0.56
	1923 ..	19.04	54.82	61.14	0.54
	Means ..	18.32	52.95	60.40	0.53
Border Leicester-Merino	1921 ..	—	56.14	64.64	0.58
	1922 ..	21.51	61.00	69.42	0.63
	1923 ..	22.72	61.97	68.50	0.62
	Means ..	22.12	59.70	67.52	0.61

TABLE VI.—*continued*

Date.	Year.	Weight at Tailing Lbs	12 Weeks. Lbs.	14 Weeks. Lbs.	Average Increase per Day. Lbs.
Romney Marsh-Merino	1921 ..	—	57.70	64.30	0.57
	1922 ..	21.61	55.19	62.48	0.56
	1923 ..	23.43	59.73	65.22	0.58
	Means ..	22.52	57.54	64.00	0.57
	Lambs by South Downs—				
Lincoln-Merino	1921 ..	—	47.97	54.76	0.48
	1922 ..	18.45	54.41	61.21	0.54
	1923 ..	16.66	51.50	60.69	0.54
	Means ..	17.56	51.29	58.89	0.52
English Leicester-Merino	1921 ..	—	47.37	54.41	0.48
	1922 ..	15.30	48.33	56.73	0.50
	1923 ..	24.41	46.81	54.15	0.47
	Means ..	19.86	47.50	55.10	0.48
Border Leicester-Merino	1921 ..	—	54.79	62.12	0.55
	1922 ..	21.23	52.32	60.78	0.54
	1923 ..	22.07	52.74	60.16	0.53
	Means ..	21.65	53.28	61.02	0.54
Romney Marsh-Merino	1921 ..	—	44.40	52.62	0.46
	1922 ..	19.19	53.31	59.51	0.53
	1923 ..	21.20	45.37	51.11	0.41
	Means ..	20 20	47.69	54.41	0.47

Unfortunately, at the commencement of the test the weight of lambs at tailing was omitted. At the end of the fourteenth week the highest average weight was secured from the lambs out of the Border Leicester-Merino ewes by Dorset Horn rams. Of the other lambs sired by Dorset Horn, those from Lincoln-Merino ewes come next in order of merit, and are followed by those from Romney and English Leicester-Merino ewes. The same order in regard to ewes bred to Shropshire rams has been observed. In the case of the South Down lambs, the progeny from English Merfino are slightly weightier than those from Romney Marsh-Merino ewes. On the ordinary farm, higher average weights would probably be obtained, as the yarding and weighing, which these tests entail, tend to check their development.

TABLE VII.—*Showing the Influence of the Sire on the Early Maturity of Lambs from Half-bred Longwool-Merino Ewes, Seasons* 1921-1923.

Age at Weighing.	Average Weight of Lambs by— Dorset Horn. Lbs.	Shropshire. Lbs.	South Down. Lbs.
Tailing	23.68	21.03	19.82
12 weeks	63.72	57.16	49.94
14 weeks	71.69	64.47	57.36

The extent to which each sire promotes early maturity on the lamb is clearly shown; the Dorset Horn lambs to the extent of approximately 7¼lbs. above the Shropshire and 14⅓lbs. above those by South Down when 14 weeks of age.

TABLE VIII.—*Showing the Influence of Dam on the Early Maturity of Lambs Sired by Down Rams, Seasons* 1921-1923.

Age at Weighing.	Average Weight of Lambs from— Lincoln-Merino.	English Leicester-Merino.	Border Leicester-Merino.	Romney Marsh-Merino.
	Lbs.	Lbs.	Lbs.	Lbs.
Tailing	21.77	19.56	22.32	21.71
12 weeks	58.37	53.73	60.66	55.00
14 weeks	66.19	61.43	68.70	61.80

In this table it is shown that the Border Leicester-Merino ewe influences early maturity to the extent of about 2½lbs. over the Lincoln-Merino and 7lbs. over both the Romney Marsh and English Leicester-Merino.

INCREASE IN WEIGHT OF LAMBS.

The question as to when the lamb increases in weight at the greatest rate is more or less influenced by the season, for it is more likely to mature faster in warm, sunny weather than under cold, wintry conditions. Further, the time of the year at which the forage attains the feeding value essential for rapid flesh production varies with the season. Thus considerable fluctuations occur as to rate of maturity.

TABLE IX.—*Showing the Average Daily Increase in Weight of Lambs by Down Rams from Half-bred Longwool-Merino Ewes, Seasons* 1921, 1922, *and part* 1923.

Period.	Lincoln-Merino. Increase per Day.	English Leicester-Merino. Increase per Day.	Border Leicester-Merino. Increase per Day.	Romney Marsh-Merino. Increase per Day.
	Lbs.	Lbs.	Lbs.	Lbs.
Lambs by Dorset Horn Rams.				
Tailing to 12 weeks	0.52	0.54	0.61	0.45
12 to 14 weeks	0.60	0.58	0.63	0.47
14 to 16 weeks	0.81	0.80	0.84	0.73
16 to 18 weeks	0.57	0.49	0.57	0.47
18 to 20 weeks	0.39	0.31	0.44	0.39
Means	0.58	0.54	0.62	0.50
By Shropshire Rams.				
Tailing to 12 weeks	0.51	0.43	0.48	0.44
12 to 14 weeks	0.54	0.53	0.56	0.46
14 to 16 weeks	0.77	0.66	0.81	0.72
16 to 18 weeks	0.51	0.49	0.55	0.54
18 to 20 weeks	0.40	0.44	0.36	0.35
Means	0.54	0.51	0.55	0.50
By South Down Rams.				
Tailing to 12 weeks	0.42	0.34	0.42	0.31
12 to 14 weeks	0.54	0.54	0.55	0.48
14 to 16 weeks	0.75	0.64	0.80	0.67
16 to 18 weeks	0.50	0.51	0.58	0.48
18 to 20 weeks	0.36	0.43	0.30	0.34
Means	0.51	0.49	0.53	0.46

The daily increase in weight of all breeds steadily rises up to the fourteenth to sixteenth week, when the maximum is reached. The lamb is then aged about four months, which, with us, corresponds to about the middle of September. From that time onwards there is a gradual reduction in the amount of weight increase per day. In comparing the ewes it is seen that the Border Leicester-Merino leads in every case, and shows the greatest average increase per day when mated with the Dorset Horn. During the fourteenth to sixteenth week this breed of lamb lays on flesh at the rate of 0.84lb. per day, closely followed by the lamb from the same ewe by Shropshire, which increases at the rate of 0.81lb. per day. The slowest mean increase per day recorded in these tests, namly, 0.46lb., was produced by the lambs from Romney Marsh-Merino ewes when mated with the South Down. In the examination of these figures cognisance must be taken of the fact that all lambs are simply grass fed.

Time of Marketing.

As the ploughing advances on the farm, the grazing areas for the lamb-breeding flock are consequently reduced, and a question of importance to the farmer is how soon will his lambs be fit to sell. A lamb loses on dressing approximately half its live weight, allowing for wastage in transit, therefore prime lambs intended for export should be marketed when they scale from 72lbs. to 76lbs. live weight. The minimum at which well-furnished lambs should be sent for slaughter is 70lbs., and this figure has been adopted in the preparation of the appended table.

Table X.—*Showing the Percentage of Lambs of each Cross which Reach a Marketable Weight at Certain Periods, Seasons* 1921-1922.

Lambs Marketable by End of	EWE. Lincoln-Merino.			English Leicester-Merino.			Border Leicester-Merino.			Romney Marsh-Merino.		
	Lambs by			Lambs by			Lambs by			Lambs by		
	D.H.	Shrop.	S.D.	D.H.	Shrop.	S.D.	D.H.	Shrop.	S.D.	D.H.	Shrop.	S.D.
	%	%	%	%	%	%	%	%	%	%	%	%
12th week	39·82	27·66	11·37	23·85	3·03	0·00	58·40	21·78	5·90	21·21	6·75	2·86
14th week	61·98	40·92	23·11	62·01	20·09	10·04	81·83	49·64	25·80	40·91	30·04	8·66
16th week	87·50	75·17	48·49	80·96	52·69	37·54	98·82	80·54	62·74	81·81	73·30	39·27
18th week	95·00	83·16	64·78	92·15	70·04	58·88	100·00	87·44	88·54	92·42	95·04	59·70
20th week	97·50	88·73	84·48	96·88	87·49	84·17	100·00	93·52	100·00	98·48	96·77	84·94
Lambs below export weight	2·50	11·27	15·52	3·12	12·51	15·83	0·00	6·48	0·00	1·52	3·23	15·06

Export lambs are rarely shorn, as the value of the wool is comparatively small; moreover they are liable to be depreciated in value as a result of the handling and drafting inseparable from shearing operations. Consequently most of the lambs which have not attained the required standard by the end of the twentieth week would probably have to be carried on to the following autumn. The last weighing corresponds to the first week in October, and all the lambs held after

that are better shorn. Here again the Border Leicester-Merino-Dorset Horn cross leads the way, and approximately 84 per cent. of the progeny are saleable towards the end of August, and 99 per cent. early in September. Lambs which can be placed on the market early in the season are mainly by Dorset Horn, followed by the Shropshire and a few South Down, the highest numbers being secured from the Border Leicester and Lincoln-Merino ewes, followed by English Leicester and Romney Marsh-Merino Ewes in that order. Our experience has been that the English Leicester-Merino ewe does not mate as early in the season as the other half-breeds, consequently many of her lambs are comparatively late, and are at a disadvantage for early marketing. The lowest percentage of immature lambs is found in those sired by Dorset Horn. Further, the Dorset Horn lambs appear to recover more quickly after a check than those by the other two breeds.

Loss of Weight on Transit and Dressing.

The figures given in the following tables represent the results obtained from five lambs of each breed, and indicate that a considerable amount of weight is lost between the time of leaving the farm and reaching the saleyards. Although it is difficult to say the quantity, yet a certain percentage of this weight must be represented by loss of tissue.

Table XI.—*Showing the Loss of Weight in Travelling to Market and the Loss of Weight in Dressing of Lambs from Merino Ewes, Season* 1923.

	Average Weight.			Average Loss.		
Sire.	Farm.	Abattoirs.	Dressed.	Transit.	Dressing.	Total.
Longwools—	lbs.	lbs.	lbs.	lbs.	Per cent.	Per. cent.
Lincoln	75.2	69.4	35.6	5.80	48.70	52.66
English Leicester .	72.4	66.8	35.2	5.60	46.71	51.38
Border Leicester .	71.0	66.75	32.25	4.25	51.31	54.23
Romney Marsh .	71.6	66.0	32.4	5.60	50.91	54.75
Means	72.55	67.24	33.86	5.31	49.33	53.26
Shortwools—						
Dorset Horn	74.4	66.6	32.8	7.8	50.75	55.76
Shropshire	75.2	66.6	33.6	8.6	49.55	55.32
South Down	66.2	61.8	31.2	4.4	49.51	52.87
Means	71.93	65.00	32.53	6.93	49.94	54.65

Table XII.—*Showing the Loss of Weight in Transit to Market and Loss of Dressing of Lambs by Down Rams from Half-bred Longwool-Merino Ewes, Season* 1923.

Lambs by Dorset Horn:—

	Average Weight.			Average Loss.		
Ewe.	Farm.	Abattoirs.	Dressed.	Transit.	Dressing,	Total.
	lbs.	lbs.	lbs.	lbs.	Per cent.	Per cent.
Lincoln-Merino ..	78.60	72.0	40.4	6.6	43.89	48.63
Eng. Leic.-Merino	76.40	71.0	38.4	5.4	45.92	49.74
Bord. Leic.-Merino	76.00	70.4	37.6	5.6	46.59	50.53
Rom. Marsh-Merino	74.00	68.6	36.0	5.4	47.52	51.38
Means	76.25	70.5	38.1	5.75	45.82	50.03

Lambs by Shropshire:—

Ewe.	Average Weight. Farm. lbs.	Abattoirs. lbs.	Dressed. lbs.	Transit. lbs.	Average Loss. Dressing. Per cent.	Total. Per cent.
Lincoln-Merino ..	76.0	69.8	37.6	6.2	46.13	50.53
Eng. Leic.-Merino	73.0	67.6	36.0	5.4	46.75	50.68
Bord. Leic.-Merino	74.8	70.2	38.8	4.3	44.73	48.13
Rom. Marsh-Merino	76.6	76.4	37.4	5.2	47.62	51.17
Means	75.1	69.75	37.45	5.35	46.31	50.13

Lambs by South Down:—

Lincoln-Merino .	75.4	69.6	39.6	5.8	43.10	47.45
Eng. Leic.-Merino	72.6	69.0	39.6	3.6	42.61	45.45
Bord. Leic.-Merino	74.2	69.8	39.0	4.4	44.13	47.14
Rom. Marsh-Merino	70.8	67.4	36.8	3.4	45.40	48.02
Means	73.25	68.95	38.75	4.3	43.81	47.02

It is to be noted that the South Down exerts considerable influence on the amount of weight lost on travelling and also on the percentage of loss on dressing. The lambs containing Lincoln blood have in every group suffered the most loss of weight in the journey to market, whilst the Romney Marsh shows the greatest loss on dressing. A comparison of these figures with those given in connection with the Merino ewe show that, although we can expect a carcass of about 50 per cent. live weight from her lamb, with that from the half-bred ewe only about 45 per cent. loss need be anticipated.

TABLE XIII.—*Showing the Monetary Value of the Various Crossbred Lambs, Season* 1923.

Dam.	No.	Live Weight. lbs.	Dressed Weight. lbs.	Value of Carcasses at 8d. ℔ lb. £ s. d.	Value of Fat. s. d.	Value of Skins. £ s. d.	Total Value. £ s. d.	Value ℔ lb. Live Weight on Farm. d.	Value ℔ Head at Average Age of 14 weeks £ s. d.
LAMBS BY DORSET HORN.									
Lincoln-Merino	5	393	202	6 14 8	1 10	0 19 1	7 15 7	4·76	1 9 3
English Leicester-Merino	5	382	192	6 8 0	1 8½	0 18 3	7 7 11½	4·65	1 6 8
Border Leicester-Merino	5	380	188	6 5 4	1 10½	0 19 2	7 6 4½	4·62	1 10 0
Romney Marsh-Merino ..	5	370	180	6 0 0	1 8½	1 0 4	7 2 0½	4·61	
LAMBS BY SHROPSHIRE.									
Lincoln-Merino	5	380	188	6 5 4	2 1	0 19 1	7 6 6	4·63	1 5 5
English Leicester-Merino	5	365	180	6 0 0	1 8	0 18 2	6 19 10	4·60	1 3 2
Border Leicester-Merino	5	374	194	6 9 4	1 11½	0 19 2	7 10 5½	4·83	1 7 2
Romney Marsh-Merino ..	5	383	187	6 4 5	1 11½	1 0 4	7 6 11½	4·60	1 4 6
LAMBS BY SOUTH DOWN.									
Lincoln-Merino	5	377	198	6 12 0	1 8	1 0 4	7 14 0	4·90	1 4 1
English Leicester-Merino	5	363	198	6 12 0	1 8	0 16 3	7 9 11	4·96	
Border Leicester-Merino	5	371	195	6 10 0	1 9½	0 15 5	7 7 2½	4·76	1 4 2
Romney Marsh-Merino ..	5	354	184	6 2 8	1 8	0 15 10	7 0 2	4·75	
Sire.		LAMBS FROM MERINO EWES.							
Lincoln.....	5	376	178	5 18 8	1 6½	0 17 10	6 18 0½	4·41	0 19 3
English Leicester.....	5	362	176	5 17 4	1 11½	1 5 2	7 4 5½	4·79	1 1 11
Border Leicester	5	347	158	5 5 4	1 2	0 19 6	6 6 0	4·35	0 16 11
Romney Marsh	5	358	162	5 8 0	1 6	1 6 0	6 15 6	4·54	1 0
Dorset Horn	5	372	164	5 9 4	1 7	0 16 11	6 7 10	4·12	1 1
Shropshire	5	376	168	5 12 0	1 7	0 19 11	6 13 6	4·26	1 2 10
South Down	5	331	156	5 4 0	1 1½	0 15 0	6 0 1½	4·35	

Summarising from the above data the following averages are obtained:—

Average return per lamb at age of 14 weeks.	£	s.	d.
1. Dorset Horn Ram x Longwool-Merino Ewe	1	7	10
2. Shropshire Ram x Longwool-Merino Ewe	1	5	1
3. Southdown Ram x Longwool-Merino Ewe	1	3	2
4. Down Rams x Longwool-Merino Ewe	1	5	4
5. Down Rams x Merino Ewes	1	1	5
6. Longwool Rams x Merino Ewes	0	19	7
7. Down and Longwool Rams x Merino Ewes	1	0	4

In Table XIII. the value of the carcass has been assessed at a flat rate of 8d. per pound, for although export lamb is valued according to the grade, yet, as far as the local market is concerned, weight appears to be the main factor in fixing the price. In order to secure the export value of one strain compared with another, it would be necessary to ascertain the percentage of lambs of each grade that can be expected in that particular cross under average conditions. For instance, it is quite possible that one cross may average a greater number of super and first grade carcasses than another, and in consequence merit a higher price per pound. At present we are not able to supply information on this question, but it is a phase which it is proposed to investigate.

The Metropolitan Abattoirs' price for fat has been adopted, namely, 1½d. for first grade and 1d. for second. Mr. Rosman, of Wilcox, Mofflin, & Co., kindly valued the skins, and in his report commented upon the fact that in some instances the type of wool followed the ewe and in others the ram. This was very noticeable in the South Down crosses, which were very short in the staple. The highest returns for skins were obtained from lambs by Romney Marsh rams from Merino ewes. This sire appears to influence the skin value, and except when mated with the South Down has in each group shown the greatest monetary return.

The amount of weight which the breed loses on dressing affects the value per pound live weight, and we find the highest price per pound given for lambs from English Leicester-Merino ewes by South Down rams. On reference to the previous table it will be seen that this cross gave the lowest percentage of loss on dressing. The last column of the table has been obtained by taking the average weight of lambs of each cross at the end of the fourteenth week, and applying the value per pound live weight. By this means we are able to arrive at the comparative values of the various crosses. At the age of fourteen weeks it is observed that the lambs by Dorset Horn from Border Leicester-Merino ewe show a value of 30s. per head. Lambs by the same sire from Lincoln-Merino follow with an average of 29s. 3d. per head, whilst next in order of merit is the Shropshire-Border Leicester-Merino lamb, showing a monetary value of 27s. 2d.

Dealing with the half-bred ewe, we see that the Border Leicester-Merino occupies the top position in each group. When the Merino ewe is used as the mother, the progeny of the Shropshire show the greatest cash value, whilst of the lambs sired by longwools, those by English Leicester are the most remunerative. These money values have been based on Abattoirs' rates this season, and since the sales took place

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before the export buyers were able to operate, local values, and not export value, have been adopted. It is possible that when the export trade values prevail a higher price per pound would be realised by sellers of South Down and Shropshire crosses, as these will generally command higher average figures on the London market.

No definite conclusions can be given from tests which have been carried out over such a limited period, but the results so far obtained tend to indicate:—

That the Shropshire is the most profitable ram with which to mate the Merino ewe, although the progeny of the English Leicester and Dorset Horn are but little inferior.

That the Border Leicester-Merino is the most profitable of the half-bred longwool-Merino ewes under test.

That when mated with half-bred Longwool-Merino ewes the Dorset Horn ram produces the earliest maturing and most remunerative lamb at local values.

In conclusion, I wish to place on record our indebtedness to Mr. G. A. W. Pope (General Manager) and Mr. J. D. Sellars, of the Government Produce Depot, for their help and co-operation in this work; also to Mr. Ive (Works Manager) for allowing these tests to be carried out at the Metropolitan Abattoirs.

DISCUSSION.

Mr. W. H. Cumming (Strathalbyn) said that he considered the searing iron for tailing more cruel than the knife. Mr. H. Saunders (Nunkeri and Yurgo) asked whether there would be a corresponding increase in the loss of weight according to the length of the journey from the farm to the market. If the export trade was to be encouraged or fostered it would appear that a more up-to-date method of marketing or transport would be required. Mr. F. Masters (Roberts and Verran) pointed out the difficulties under which the farmers on the West Coast had laboured in marketing their lambs. They were now providing a freezing works at Port Lincoln, and any information they could secure regarding the best breeds to employ in catering for the fat lamb market would be most useful to them. He was pleased to hear that results of breeding crossbred lambs from Merino ewes were being compiled, because he was of the opinion that they would have to adopt that course owing to the difficulty of obtaining crossbred ewes. Mr. A. L. Molineux (Tarlee) stated that he had obtained good results over a number of years with the Shropshire-Merino cross. Later he had tried Dorset Horn-Merino cross with excellent results; they produced an early maturing lamb, and he considered that was the best cross for the small farmer in the lower and middle northern districts.

Mr. R. Scott, in reply, said he did not consider the use of the searing iron more hurtful than the knife for tailing, and his experience had been that if affected the lambs to a lesser degree.

Tuesday, September 11th.—Evening Session.

Mr. A. H. Codrington (Wool Instructor of the School of Mines) delivered an address in which he dealt with the "Classification of the Farmers' Clip for Market."

ROOT CROPS AND THEIR VALUE.

The following paper was presented by Mr. H. B. Michelmore of the Meadows Branch:—

It is at the season of the year when the succulent feed has disappeared and the stored dry fodders have to be relied upon that the farmer, especially the dairy farmer, regrets that he has nothing upon which he can fall back to provide the nourishing food which stock generally relish. We, as dairymen, have not yet learned the lessons taught by the English and New Zealand producers in relying upon root crops to tide over the period of shortage, neither have we fully appreciated the fact that roots, such as turnips, mangolds, &c., are economical flesh and fat producing fodders, and on the dairy farm have qualities for milk production that are rarely excelled. Broadly speaking, the Australian dairymen relies upon lucerne to prevent a food shortage on his farm, and where lucerne can be grown successfully the anxious period of winter and early spring is easily negotiated, for lucerne can be used in the green stage in the spring, summer, and autumn, and in the form of hay during the winter. However, the addition of a few roots to the hay ration, though not absolutely essential, is highly desirable. But there are hundreds of farms on which lucerne cannot be successfully grown, and, therefore, its place must be taken by annual fodder crops. The choice, therefore, lies in such cases between hay, or roots and hay, for winter, and green annual forage, such as sorghum and maize, for summer on the one hand, and on the other, a never-failing supply of ensilage for both summer and winter use; but the best subsidiary fodder to ensilage is undoubtedly the root crop. The essence of farming is the production of crops that either in themselves represent marketable commodities, or are capable of being converted into such commodities through the agency of live-stock. Of all farm animals, the dairy cow is the most efficient in this regard. The fact that the dairy cow is able, from a given weight of food, to produce a greater quantity of saleable product than any other animal means that crops fed to cows are of greater value than when fed to any other class of animal. In consequence, it is in the feeding of cows that the greatest advancement can be made at the present time. It is not by any means overstating the case to say that a very large proportion of our dairy cows are not fed sufficiently during the year to enable them to yield their maximum capacity. Very often the adequate feeding of dry cows is much neglected, and this has a very potent bearing on the low average yield of milk and butter fat production. The idea, apparently, is that under-feeding the cows during the dry period will reduce the amount devoted to maintenance. Such a system in no way accomplishes this, but tends very seriously to reduce the butterfat yield in the following season, because a large proportion of the spring feed is used to replace the weight lost in the winter. It is, therefore, desirable that all dairy cows should commence their season in really good condition. In our district we should make hay and roots the staple winter feeds. We have yet to learn the important position roots should occupy in the supplementary feeding of dairy cows. Where swedes can be success-

fully grown they can profitably be made, with hay, the main winter feed. Apart from their high yield, the fact that they can be grazed off renders them an excellent cheap crop to grow. The feeding of roots is not a subject that can be dismissed briefly, or one that can be undertaken lightly by the dairyman, but it will pay dairymen to experiment in feeding roots for future guidance. The determining factor as to whether swedes or mangolds should be grown as the chief root crop is undoubtedly the soil, the swede being, generally speaking, a light land crop and the mangold the heavy soil crop. There are, of course, some soils that will grow both crops equally well, and it is always possible to grow mangolds on light land and swedes on certain heavy soils, but, as a general rule, swedes do better on lighter soils and mangolds on the heavy. There are, however, several points connected with the feeding value of the crops that are worth some thought. One is the weight of the actual feeding material that can be produced per acre by either crop. Chemical analysis shows that no very marked difference exists in the percentage of dry matter contained in the two crops on the average, though possibly the mangold may contain slightly more than the swede. The swede grown with phosphates on suitable soils may reach 14 per cent. of dry matter, while the mangold (long red) may give as much as 16 per cent. of dry matter and seldom fall below 12 per cent. Such facts as these are well worth remembering, for it is apparent that if a crop of roots, weighing 20 tons per acre, contain 10 per cent. of dry matter, it will give two tons of actual feeding material per acre without the water, while, if a crop of the same weight per acre contains 15 per cent. of dry matter, the yield of actual feeding material will be three tons. Much has been said to show that both swede and mangold are excellent food for dairy cows, particularly the mangold during the finishing months of the average spring, but it should be always fed with extreme care at the beginning, even after it has been stored for a fairly lengthy period. The milk may have a distinct and unpleasant taint if the cows are confined to the swede crop all day. When swedes are fed to milking cows, they should be given a short time after milking. Mangolds, on the other hand, impart no undesirable flavor to the milk, but, nevertheless, care must be exercised in feeding them. No attempt should be made to allow the cows to graze off root crops during the winter months. It is infinitely better to cart a certain quantity of roots to the pasture daily, where they should be well spread about so that the greedy "boss" cows have no chance of getting more than their share. Over-feeding must be guarded against, for it sets up severe purging. To prevent illness, however, little care only is necessary. Much more care is required when feeding mangolds than when feeding swedes.

In the discussion that followed, Mr. H. Davis (Pinnaroo) expressed the opinion that as a general rule farmers did not pay sufficient attention to the growing of root crops. All classes of livestock seemed to fatten very rapidly on turnips. Last year he had tried mangolds mixed with vetches, which provided an excellent picking for the sheep that were grazed on the stubbles, and it

was his intention to continue the practice in future years. He also proposed to grow barley for fattening pigs, and to grow turnips and mangolds in small paddocks in which the pigs could be grazed. Mr. S. J. Bonney (Kalangadoo) said he grew a fair area of mangolds every year and asked whether the writer of the paper did not think it would be more economical to pulp the mangolds and feed them in conjunction with dry matter. Mr. C. Ricks (Cherry Gardens) thought that a considerable loss would be experienced if the mangolds were carted out and spread on the ground for feeding the dairy cattle. In addition to that the "boss" cows of the herd would keep the other animals from getting a fair share of the feed. A better plan was to make small troughs on wheels out of which the cattle could be fed. The Director of Agriculture (Prof. Arthur J. Perkins) congratulated the writer on the excellent paper that had been contributed to Congress. The Director agreed with Mr. Ricks that waste would be experienced if the method suggested in the paper was adopted. Mangolds, generally speaking, should be ripened before being fed to cattle, but the handling of practically any of the root crops involved a deal of labor. The crop should be pulled in autumn, the roots stacked in heaps, similar in shape to the heaps of metal that were seen on the road side; then covered with earth, and left until required for use. Provision, however, had to be made for the ventilation of the stack of mangolds. If that practice were adopted the mangolds would become quite sweet. Root crops required a fair amount of tillage during the growing season. Land on which the root crop was grown was usually required at a later stage for some other crop, and as root crops had a tendency to produce a foul growth of weeds, fair tillage operations were necessary. Root crops were very desirable in certain districts and were undoubtedly useful to the stock, but the farmers always had to consider whether there were not other crops of a more suitable nature for the conditions of the district. Root crops were chiefly grown in those districts where winter growth was not abundant. In districts where winter feed was short, farmers had a choice of either root crops or ensilage. The question that then arose was, "Which is the most economical form of conserving fodder"? Personally the Director favored ensilage, after the expense incurred in the initial outlay had been faced. Most of the cruciferous plants tainted milk and all dairymen should be careful how they were used. Mr. R. Wheaton (MacGillivray) mentioned that he had grown turnips for several seasons and had always obtained best returns by sowing the seed any time after the beginning of November and up to the commencement of January, after a good rain had been received. Mr. Michelmore, in reply, agreed that pulping the mangolds was a much better practice than carting them in bulk out on to the land. His experience regarding the time of sowing was that the later in the season the seed was sown the better results it would give. He favored sowing about the first week in January, when only very few weed seeds would germinate, and tillage operations would be reduced to a minimum.

CULTIVATION OF THE SOIL.

Mr. W. J. Spafford (Superintendent of Experimenal Work) then read the following paper:—

Soil cultivation, or soil tillage, is of the utmost importance where crop-growing is being considered, and when the factors controlling successful husbandry are to be taken into account, it is very doubtful if any one of the agents over which man has an influence, is of equal value. If it be possible to put the principal instrumentalities governing the production of profitable crops in their order of importance, they would probably be placed somewhat as follows:—(1) climatic conditions, (2) soils, (3) cultivation, (4) rotation of crops, (5) fertilisers, (6) varieties, etc., etc., and if this is so, when we have discovered a new but favorable set of natural conditions, existing in conjunction with arable soils, our first concern of any consequence when we undertake to grow crops, will be to find the best manner to cultivate the soils for the crops we set about growing, and our success in crop raising will depend very largely on our ability to attain this knowledge comparatively quickly. This will apply to all types of crops in all countries, and has already been proved for every crop we grow in this State, and has been particularly striking in the case of the crop we have almost specialised in, namely wheat. This is not generally recognised by South Australian farmers, largely it appears, because the very extraordinary and astonishing effects of applications of light dressings of phosphatic fertilisers to our wheat crops are still fresh in the memories of most of them. It is but a few years ago, that wheat growing, which had fallen below a profit-earning business in many districts of the State, was suddenly put on a lucrative basis by the use of phosphates, in all of those districts possessing favorable climatic conditions. This rapid and remarkable alteration in the results secured from our wheat growing activities, appears to have made such an impression on farmers' minds, that it is still generally considered that the discovery of the value of applications of superphosphate to our wheat crops, has been the greatest advancement we have made towards success with this crop, and it seems that the abruptness of the improvement wrought, has largely overshadowed what we have learned of other cultural methods, for our particular conditions. Although the amelioration of our cultivation practices, has been much more gradual than in the case of the use of superphosphate, nevertheless it has had at least an equal effect on our present day success with the handling of wheat crops, and in the future will have a much greater one. A glance at the following figures will serve to show the present day

efficacy of a dressing of superphosphate to a wheat crop, compared to the returns obtained from well tilled land, not manured:—

Effect of Superphosphate on Wheat in Well Tilled Land.

Farm.	Mean Yield per Acre. No Manure. Bush. lbs.	1cwt Super per Acre Bush. lbs	Increase over No Manure Bush lbs.	Period
Roseworthy Agricultural College ..	14 53	18 33	3 40	1905-22 (18 yrs.
Veitch Experimental Farm	14 4	16 49	2 45	1915-22 (8 yrs.)
Booborowie Experimental Farm ..	20 39	29 29	8 50	1917-22 (6 yrs.)

The figures used are selected from three districts representing the bulk of our wheat-growing country—Roseworthy Agricultural College, with calcareous soils, with an average annual rainfall of 17.29in., and typical of our better mallee districts; Veitch, with light-textured, calcareous soils, only registering an average annual rainfall of 12.89in., and fairly typical of much of our comparatively low rainfall mallee country; Booborowie, with red-colored, heavy-textured, fertile soils, recording an average annual rainfall of 17.44in., and typical of much of our lower north.

It is a fact, clearly remembered by many South Australians, that before the introduction of phosphatic fertilisers to this State for wheat-growing, the district which is represented by Roseworthy Agricultural College, did well, when the wheat crops returned more than an average of 6bush. per acre. An examination of the figures compiled by the Government Statist, shows that in County Gawler, which includes Roseworthy College, the average yield of wheat, for the 18 years preceding the general use of superphosphate, that is to say, from 1876 to 1893, was only 5bush. 45lbs. per acre. Now the figures given above for the Roseworthy Agricultural College indicate that the application of 1cwt. of superphosphate per acre to wheat crops, has only given an average increased yield of 3bush. 40lbs. for the past 18 years, over and above the yields secured from wheat crops grown on land not manured, whereas all improvements in our farming methods, made since fertilising with phosphates was originated, are shown to give on the experimental plot receiving 1cwt. of superphosphate per acre, an average increased yield of between 12bush. and 13bush. per acre, in excess of what could have been expected before the value of dressings of superphosphate became known. For the same 18-year period—1905 to 1922—the wheat crops of County Gawler produced an average yield of 13bush. 9lbs. per acre. As the climatic conditions and the soils at Roseworthy Agricultural College, are not better than those of the average farm on which wheat is produced in County Gawler, it is

only reasonable to suppose that the heavier crops grown, are due to the fact that better farming methods are practised at that institution than by the average wheat grower of the county, still the average increased yield of 7bush. 24lbs. per acre for this county, since superphosphate was introduced, is greater than can be expected from the use of this fertiliser alone.

The increase in present-day yields, in excess of that which is brought about by dressings of phosphatic manures, is not of course, wholly due to improved soil-tillage practices, but although some of the improvement is due to the complete alteration in the type of variety grown, the carrying of greater numbers of grazing livestock, resting the land, etc., etc., the progress made in methods of cultivation, is easily the most important of the noticeable causes of this advancement. In the particular block of land where these experiments were conducted, the resting of land and the carrying of large numbers of farm livestock, which has such a marked improving effect on the crop producing powers of land, have not played a large part towards the increased yields, because the plots have been carried out on the bare fallow—wheat—bare fallow—wheat rotation, and all wheat crops have been cut with a binder when ripe and then threshed, and the only grazing available has consisted of a short stubble, and the little that grows between harvest and ploughing times.

The really high yields from land not manured, as quoted above, will only apply for land which is barefallowed, and where thorough and correct cultivation practices are used, and under such conditions show what can be done with proper methods.

Applications of superphosphate to the soil certainly placed crop growing in South Australia on a firm basis, and in enabling farmers to again make profits, was the general incentive to further progress, the principal line followed being that of better soil tillage. We know also, that in most of those places, where for any reason the soils cannot be cultivated in the best possible manner, profitable crop-growing without the use of phosphatic fertilisers is practically impossible, and that in the best of conditions in this State, even with good tillage, applications of phosphates prove directly profitable to crops, increase the grazing capacity of the soil after the crops are harvested, and render the land conducive to good health in the livestock supported on it. Phosphatic manures have helped our agriculture very considerably, but while we have been giving them full credit for what they have done, we have been inclined to lose sight of the agricultural knowledge gained in other directions, and it appears now, that we


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have learned so much regarding the cultivation of our soils, that, in common with all countries which have been well farmed for any length of time, we can claim that proper cultivation of the soil does most towards successful crop-growing.

The importance of tillage, applies to the soil preparation for all of the crops we grow, and although we have made very rapid progress in our methods of cultivating the soil, still more can be done, and a knowledge of the why and wherefore of the various operations, should hasten on the required forward movement.

Why We Cultivate the Soil.

Where the climatic conditions are not too severe to prevent plant growth, practically all soils naturally support plants of some kind or other, so showing that cultivation is not essential to the growth of plants.

The crowding of human beings on to comparatively small areas, however, has necessitated the production of much more vegetable food from the soil, than will grow there naturally, and in bringing about this increased growth, it has been found to be of fundamental importance, that the land be tilled, and that the more precise this tillage is, the greater will be the growth obtained. This process of increasing plant growth by cultivating the soil, has been practised for a very considerable time, with most of the crops which we grow to serve the needs of man, and during this time most of the plants handled, have been so altered, as to be at present very unlike the "wild" plants from which they were originally derived. In this transformation, the plants have lost their original hardiness, and cannot compete with plants which have not been pampered to the same extent, such as those we know as weeds, and this long course of special soil treatment has not only rendered all of the cultivated crops largely dependent on good soil tillage to produce heavy yields, but many of them now rely on the thorough stirring of the soil, for their very existence. We see this with the cereals, which on well cultivated land in this State, will make strong growth, and if the crops be left unharvested, and livestock be kept from them, will possibly produce fair "self-sown" crops, but if left another year, very few, if any, plants will grow at all, and finally all will disappear from the land.

Principal Means by which the Object of Soil Tillage is Achieved.

Soil tillage has the one object of producing maximum returns from the crops the cultivator sets about growing, and it does this by rendering possible the crowding of more plants on the land than will grow there naturally, and by eliminating other kinds of plants, which would compete with the crop for air, moisture, and mineral plant food.

Of the many ways in which plants are helped by tillage towards this goal, the following are of great importance, and require consideration:—

(*a*) Increasing the supply of air in the soil.
(*b*) Admittance and retention of soil water.
(*c*) Rendering soil mineral matters available to plants.
(*d*) Encouraging the activities of the useful soil bacteria.
(*e*) The control of weeds.
(*f*) The creation of the seed bed.

Increasing the Supply of Air in the Soil.

It is a well-known fact, proved by a great number of experimenters, that a direct supply of oxygen is indispensable to the roots, as well as to the other growing parts of the plant, and also that a plentiful supply of this gas is necessary for the rapid germination of seeds. It is generally recognised, that the increased growth of plants which follows good soil tillage, is very largely due to the fact that a greater supply of air is accessible to their roots, and, that an abundance of air is necessary, must have been noted by most farmers, because it is by no means an uncommon occurrence for crops to die, and seeds to fail to germinate, for the lack of oxygen, when air is excluded from the soil by the presence of an excess of water.

A plentiful supply of air in the soil is of the utmost importance to encourage the activities of the useful soil bacteria, by supplying oxygen for the direct needs of the bacteria, for the oxidation of the organic matter, and as a direct supply of nitrogen, and the greater the amount of air admitted to the soil, providing also that water be present, the larger the quantity of mineral plant food which is rendered available to plants, from its insoluble combinations.

These latter points will be considered in more detail under the headings "Rendering Soil Mineral Matters Available to Plants" and "Encouraging the Activities of the Useful Soil Bacteria," but it must be remembered, that in a general way, cultivating the land allows much more air to enter the soil than can get there naturally, and this increased and more regular supply, admits of a greater number of plants being grown on a given area. When land is left uncultivated it obtains most of its air by direct absorption, and by changes of barometric pressure, and in these conditions, because of the limited air supply, plants must have much of their root systems near the surface, to get sufficient oxygen, with the inevitable result that they tend to crowd one another out. Tillage operations increase the amount of air a soil can take, by increasing the pore space of the soil, and by directly aerating it when the implements lift up the particles.

Admittance and Retention of Soil Moisture.

Growing plants require water throughout their vegetative period, and this water is uninterruptedly pumped from the soil by the roots, passed up the tissues of the plant, and after some small proportion is retained, the bulk of it is evaporated from the leaves. The rigidity of the growing parts of most plants is dependent on the presence of an adequate supply of water, and when for any reason, they cannot get sufficient of this substance for their needs, they become flaccid, or, as we usually say, they wilt, and should the supply be cut off altogether they will die. This incessant flow of water from the soil to the leaves, during the whole life of annual plants, means that an enormous amount of water must be accessible to the roots of the crops we grow, and as the amount actually transpired has often been measured, a glance of some of the figures obtained will help to demonstrate how very important water is to plant growth. Many experimenters in other countries have also ascertained the water requirements of growing plants, but the figures secured in the neighboring State of Victoria by the Superintendent of Agriculture (A. E. V. Richardson, M.A., B.Sc. (Agric.)) are likely to be most applicable for South Australia. Mr. Richardson has been measuring the amount of water passing through various crops, for some years now, at both Rutherglen and Werribee, and has found that for every pound of dry matter formed by the wheat crop, the water transpired by the plants, has varied from 271½lbs. to 518lbs., with an average of about 428lbs. If we apply this average figure of 428lbs. of water needed for each pound of dry matter formed, to a crop of wheat the total produce of which weighed two tons, and contained 10 per cent. of moisture when harvested, we will see that the crop required about 173,000 gallons of water per acre, equal to more than 7½ inches of rain, to pass through the tissues of the plants between germination and maturity. These figures certainly help us to realise the importance of water to growing plants, and as cultivation does much towards allowing the maximum amount of the rain that falls to enter the land, and if properly practised tends to retain this in the soil, it is of considerable value in helping crops in this direction.

Admittance of Water into the Soil.

All soils when left undisturbed tend to become fairly compact at the surface, and when rain falls, it finds some difficulty in entering them, and if the rain showers be at all heavy, only a part of the water enters the soil, and much runs off the surface. Stirring the land with tillage implements roughens the surface, and presents obstructions to the flow

of water, with the inevitable consequence that much more of the rain that falls sinks into the soil, than is the case where it is left untilled.

It is a matter of common knowledge that cultivation increases the bulk of the soil, as can be plainly seen while land is being ploughed, for then the freshly ploughed land is usually inches higher than the unploughed portion. As this increase in bulk does not mean an increase in the number or size of the particles of the soil, it must mean an increase in the pore spaces, and this augmentation of the soil spaces makes room for more water, and so cultivation not only increases the ease with which the rain will enter the soil, but it also allows the soil to hold more water.

RETENTION OF WATER IN THE SOIL.

When water enters the soil it gradually sinks downwards, attracted by the force of gravity, and it is reasonable to suppose that if this was the only force acting on the soil water, it would eventually be drawn so far into the soil that it would pass beyond the reach of plants, or else arrive at an impervious layer and then run away. But, while the force of gravity is pulling the water downwards, another powerful natural force, known as surface tension, is also acting on the water, pulling it to the soil particles. Surface tension, or the attraction of the surfaces of the solids for liquids, is commonly evidenced in every-day life, by such instances as (1) the inside of a glass tumbler retaining water after pouring out the water with which it was originally filled, and (2) the holding together of the hairs of a brush, which are usually distended when dry, as with a shaving brush or paint brush, after plunging it in water.

Now these two forces act in opposition to each other at one and the same time—gravity pulling the water downwards, and surface tension pulling it to the soil particles, until a state of equilibrium is reached between the two, and then the water sinks no farther. When the soil water comes to rest it is in the form of a very thin film of water surrounding all of the soil particles, and is continuous from the surface to the depth to which it was pulled by gravity. This continuous film of water surrounding the soil particles resembles a stretched rubber band, and the movement in the soil of this water, is dependent on the fact that, like the rubber band, the greatest pull is at the thinnest part. That this is so can easily be demonstrated by suspending a weight on a strip of rubber, then further stretching the top portion of the rubber, and when the bottom grip used for the stretching is freed, the weight will immediately rise. When the sinking of the soil water has been arrested, evaporation takes place at the surface of the soil, with the result

that the film of water is thinned at the surface, and as the greatest pull is where the film is thinnest, the water rises to make good the losses, and while the water film surrounding the soil particles is continuous to the surface, this evaporation, and rising to make good the loss, continues until the soil becomes dry. The rise of subsoil moisture can only happen while the film surrounding the soil particles is continuous from the surface downwards, and anything which breaks this continuity of the film tends to prevent this rise, and the consequent loss by evaporation. We see this happen where parts of a garden have been mulched, for in the summer when the unprotected soil seems quite dry, if the mulch of straw or coarse stable manure be scraped off the land, the surface is usually quite moist; and it is often seen in the field where a bag has been allowed to lie, and when this bag is lifted the soil surface is damp while all surrounding it appears quite dry. The mulch and the bag break the continuity of the soil moisture film, and protect the moisture from the evaporating agents —wind and sun—and exactly similar work is done by cultivation, for when we cultivate land after rain, we break the continuity of the film of water and make a soil mulch, which tends to prevent the rise of the water above the point reached with the cultivating implement, and the layer of loosened soil protects the moisture from the evaporating agents. The soil moisture only rises freely to the point where the film is continuous, and although some evaporation takes place after cultivation, it is not difficult to realise that if the position where the evaporation of the soil moisture is taking place, is two inches below the surface, the losses will only be a fraction of what would occur where the soil is left firm, with the film intact right to the surface. The first heavy rain after cultivation re-establishes the continuity of the film, and so to properly conserve the soil moisture, the land should be cultivated after every rain which is sufficiently heavy to form a crust on the surface of the soil. This can be illustrated by what happens with a brick and a sponge; for if we fill a sponge with water, and hang an ordinary red building brick so that it touches the sponge, it will withdraw practically all of the water, but if the brick be filled with water a dry sponge will extract very little from it. When we cultivate we make the surface of the soil like the sponge, and if we are trying to conserve moisture, we never allow the surface to remain like the brick, but always keep it loose and open like the sponge.

Rendering Soil Mineral Matters Available to Plants.

Some mineral matters are quite essential to plant growth, and most of what is collected of these mineral foods is to be seen in the

ashes remaining after the plants are burnt, and although the total quantity is comparatively small, a plant cannot grow unless its requirements in this direction are met by the presence of adequate supplies in an available form. The mineral matters are collected by the roots of plants from the soil, and as far as we now know they can only be absorbed by plants when in solution in the soil moisture, and so anything we can do to render the mineral matters in the soil soluble in the soil moisture, will be of the greatest value.

Most normal soils are well supplied with the mineral matters needed by the plants as food, but very little of it is available to plants at any given time, as availability means solubility in soil moisture. If the stores of mineral plant foods were not mainly of non-available form, in times of heavy rains most of them would dissolve in the soil moisture, and be carried away in the drainage waters.

With many substances, solubility depends on fineness of subdivision, and as a case we can instance that of glass, which every one knows, in the form of a bottle or a tumbler, to be able to withstand liquids of most kinds for a very long period of time, yet if a glass vessel be broken up and powdered to a very fine dust, water will dissolve an appreciable amount of it. The non-available mineral plant foods are in their present form, because the particles containing them are not subdivided sufficiently to admit of their being dissolved, and they are only very gradually being rendered soluble by the further splitting up of the soil particles, but the tillage of the soil very considerably increases the amounts liberated, over and above what is the case with unstirred soils.

Soils have been formed by the disintegration of the rocks which originally formed the entire crust of the earth, under the action of natural agents, the principal ones of which are:—Moving water, glaciers, changes in temperature, winds, etc., with mechanical action, water, carbonic acid gas, oxygen, etc., with chemical action; and the growth and decay of plants. These natural agents are still at work, and as the soil particles, which are mainly small rock fragments, must be split up into still smaller particles if they are to become soluble in the soil water, we endeavor to encourage some of these disintegrating agents to work for us, and so we expose the soil as much as possible to the action of changes of temperature, water, carbonic acid gas, oxygen and bacteria.

Remembering that mineral matters must be soluble in soil moisture to be collected by plants, and that solubility depends on fineness of subdivision, the importance of exposing fresh soil particles, to the natural agents capable of splitting them up sufficiently fine to render them soluble, will be readily realised.

ENCOURAGING THE ACTIVITIES OF THE USEFUL SOIL BACTERIA.

Despite the fact that until fairly recently, soil was considered to be an inert mass, it is a generally recognised fact nowadays, that practically all soils, for some depth from the surface contain a great mass of many forms of life, including a multitude of microscopic size, and it is known that many of these minute kinds are wholly useful to man in his crop-growing endeavors. Although the activities of these soil bacteria are still but imperfectly understood, they certainly help the soil cultivator, and the work done by the useful kinds is of such importance, that it is generally recognised that the maintaining of soil fertility, is very largely a question of rendering the soil a fit medium for soil bacteria.

The useful soil bacteria undoubtedly contribute towards the success of the crop-grower, by (1) liberating mineral plant food from the complex combinations in which much of it is held, (2) splitting up organic matter, (3) converting nitrogen compounds not available to plants into nitrates, (4) collecting nitrogen from the air and storing it in the soil.

(1) As has already been pointed out, the mineral matters needed by plants, only become slowly available, but this process is hastened when bacteria are encouraged, because they digest these minerals and leave them behind in a state which higher plants can use, and in their activities, they liberate acids which help to disintegrate the soil particles.

(2) Organic matter is not a direct plant food for green plants, and is not useful to them until oxidised and split up into its component parts, which achievement is brought about by these bacteria.

(3) As far as we now know, most plants can only utilise nitrogen when in combination as a nitrate, and the conversion of other forms of this substance is done by the soil bacteria.

(4) Nitrogen is one of the essential plant foods, but plants can only use it when it is in combination as nitrates, and although there are enormous quantities of nitrogen in the world, it is mainly in the free state, and being a very inactive substance, it does not readily combine with other matters, and so many soils are deficient in nitrogen, in a form suitable for plants. Notwithstanding the fact that about four-fifths of the air consists of nitrogen gas, and plants are surrounded by this air, they cannot help themselves to the nitrogen, but some of the soil bacteria, (a) living in partnership with leguminous plants, and (b) living on dead organic matter, have the power of collecting this free nitrogen from the air, and storing it in the soil, in combination as various nitrates.

Bacteria, like all other forms of life, require an adequate supply of food, moisture, air, and more or less regular warmth, if their maximum activities are to be exerted, and tillage practices are the principal means the crop grower has at his disposal, to help the bacteria along these lines. Given sufficient organic matter in the soil for the bacteria to live on, correct tillage encourages their operations by admitting a fresh supply of air every time that the soil particles are stirred, and thus renewing both the oxygen and the nitrogen required, and by storing moisture in the soil. Perhaps more important still, is the fact that where land is well cultivated, a full supply of air is admitted to the point where the moisture is stored (which, as has already been explained, is the depth to where the implements reached), and the layer of loose earth maintained near the surface, serves to keep a fairly regular temperature just where the moisture and air are in close union.

Mr. A. E. V. Richardson, in his "Wheat and Its Cultivation," gives figures which show that cultivating the land leads to an increase in the available nitrogen of the soil. A block of land at Longerenong, in Victoria, containing 72lbs. of nitrate-nitrogen per acre 4ft. deep, on June 1st, 1912, was divided into three plots, one of which was fallowed and kept well worked, another was ploughed and left as "neglected" fallow, whilst the third was ploughed and cropped. In January, 1913, immediately after the crop was harvested, the worked fallow contained 92lbs. of nitrate-nitrogen per acre 4ft. deep, the neglected fallow only 25lbs., and the cropped land merely a trace. The sampling and analysing was continued periodically until April, 1913, and the most nitrate-nitrogen found at any time in these plots was 142lbs. in worked fallow in March, 38lbs. in the neglected fallow in February, and 46lbs. in the cropped land in March.

That this encouraging the soil bacteria to collect nitrogen is of great value to us will be realised if we remember that in many countries which have been farmed for a long time, it is not at all unusual for the farmers to find it necessary to use with their cereal crops, 1½cwts. or more per acre of such nitrogenous fertilisers as nitrate of soda or sulphate of ammonia.

Control of Weeds.

Weeds, being plants, have the same requirements as the crops to be grown, and so if allowed to develop in the soil, utilise the plant food, moisture, and air needed for the crops. Even though the weeds be returned to the soil after they have been killed, they have used in a few days, or a few weeks at the most, plant food which possibly took

months to be liberated in the soil, and it will again be a long time before these plant foods are set free from the organic matter of these weed plants. Tillage is the only means we possess of controlling most of the weeds troublesome to crops, and considering the fact that these weeds are robbers of everything that the soil can supply to our crops, it is essential that they be destroyed every time that they are in evidence on cultivated soil, and before they are any great size.

Creation of the Seed Bed.

The experience of all farmed countries in the world, and some of these have had experience in growing crops for thousands of years, is that given fertile soil, the physical condition of that soil at the time the seed is put into it, plays a greater part towards success with most crops that does anything else over which man has control, and as this seed bed is created by tillage operations, it behoves us to see to it that the need of a good seed bed is never lost sight of. For crops seeded directly into the field, the ideal seed bed may be described in a general way, as soil that has been stirred up, then worked down, so that it is freed from weeds, and has only a shallow layer of loose, friable soil overlying well compacted underlayers.

Practically all crops demand that the underlayers of the soil be so firm that the growing tips of the roots have to force their way between the soil particles, and if for any reason the reverse applies, that is to say, if open spaces exist in the underlayers of the soil, the growing plant gets a check, and it is a generally recognised fact that if the growth of the annual crop is restrained, it rarely recovers sufficiently to give maximum returns. The ill effects following checked growth are particularly severe should the restraint occur whilst the plant is young, and to avoid the danger of this happening, the soil directly below the seed should at seeding time be well compacted together. The depth of the layer of loose surface soil necessary to fulfil the requirements of an ideal seed-bed will of course vary with every type of crop being grown, and can be greater for those with large seed, than for the small-seeded kinds, but best returns are secured from most crops if this layer is comparatively shallow.

In this State we see the bad effects following a poor seed-bed with most crops which we grow in quantity, and it is specially prominent in the case of the wheat crop, and we know that if the wheat plants do not start well and make strong, healthy growth from germination onwards, the crop stands a poor chance of producing maximum yields. In those cases when wheat is seeded into a defective seed-bed, and sufficiently heavy rains to pack the soil together do not fall soon after seeding, the crop is very liable to be attacked by "Take-all" (Ophio-

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bolus graminis), and when the seed-bed is so loose and open that the crop gets a severe check in its early stages, the ravages of this disease are likely to be such as to lead to its total failure.

In Local Practice.

In this paper I have only set myself the task of explaining some of the principal points in connection with the preparing of the land for crops, with the hope that a knowledge of why certain operations are effective in increasing plant growth, will enable farmers further to improve their methods of cultivation, with more profits to themselves, and greater prosperity to the State, still I can hardly close without some brief reference to local practices.

In increasing the supply of air in the soil, deep ploughing, with the great increase in soil bulk which follows it, naturally allows of the admittance of the maximum amount of air, but in our particular conditions, other considerations must be taken into account, and we find in many parts of South Australia that great difficulty is experienced in packing the soil, after it has been ripped up deeply with the plough. Because of this trouble of creating a good seed-bed in many soils ploughed deeply, it is in most cases wiser in this State, to plough to only a comparatively shallow depth, and to aerate the land by much shallow working.

As with air for the soil, deep ploughing will admit more water than will shallow ploughing, but as this is not always a wise practice, as has just been pointed out, it is better to break up the land sooner than would otherwise be necessary, so that it is longer in the rough state to collect all the rain that falls.

For the conservation of as much water as is possible, the land must be cultivated in some way every time that a crust forms on its surface, and as the creation of the seed-bed must always be considered, no cultivation should be deeper than is absolutely necessary. If the land is free from weeds, and there is no danger of the soil readily running together if worked down fine, harrows will often break a crust, and when this is so there is nothing to be gained by using a heavier implement. When light implements will do the cultivating job, they should be used, because they not only save draught, but they rarely do damage to the seed-bed which is being prepared.

If the soil is cultivated every time that it is necessary from a moisture-conserving point of view, and when weeds are in evidence, mineral plant food will be liberated and the activities of the soil bacteria will be encouraged.

Weeds should always be destroyed by cultivation, while they are still small, then shallow work will be all that is necessary, but if for

any reason they are allowed to make much growth, the implements put on the land to kill them, will naturally have to be worked at a greater depth than is good for the seed-bed. The bad effects of deep cultivation to kill summer weeds, should be corrected by packing the land with a roller, if rain does not soon follow the deep cultivation, and as a rolled surface leads to loss of soil moisture, this implement should always be followed by a cultivator of some sort, such as harrows or a spring-tooth cultivator, to loosen up the immediate surface soil.

As all soil tillage should finish up by leaving a good seed-bed, other than for ploughing, shallow cultivation should be practised whenever a soil working is necessary. If there is any fear that the soil is too loose for best results, the land should be packed with a roller of some sort, before the seed is put in.

In present conditions we can certainly grow profitable crops in much of this State, when the land receives plenty of cultivation, finishing up with a good seed-bed, and the more intelligent work given to the land, and the firmer the under layers of the soil at seeding time, the greater will be the returns secured, from all crops seeded directly into the field.

Mr. F. G. Bonin (Pinnaroo) congratulated Mr. Spafford on what he, the speaker, considered to be one of the finest papers that had ever been submitted to an Agricultural Congress. The paper if properly digested by the farmers of the State should have a very far reaching effect on the production of wheat. Mr. A. E. Milne (Tatiara) asked whether the writer of the paper considered it would be advisable to use the plough on land that had been ploughed last year, but had had to be left out on account of the prolonged rain. Mr. Spafford stated that implement should be used which would do the job in the cheapest possible manner. If the land was not too heavily covered with weeds a set tyne cultivator should do the work, whilst if the land was of a sandy character the harrows should be able to do a good job. Mr. O. Forbes (Yadnarie) also congratulated Mr. Spafford on the excellence of his paper. Farming was quickly becoming a science and it behoved every farmer to make a careful study of the nature of the soils of his holding. Mr. A. M. Fuller (Tarlee) stated that he also had an area of land which, owing to the continued wet weather, he had not been able to get under crop. He had found it necessary again to plough the land, but he was working the soil as shallow as possible. He asked whether some of the losses could be regained by sowing Sudan grass for fodder and cutting the crop for hay, and what was the feeding value of Sudan grass. Mr. Spafford said that in Mr. Fuller's case the idea was one that was certainly well worth while putting into practice, because as a rule the district of Tarlee received summer rains. Where summer rainfall was only scanty, he would not advise putting the suggestion into practice. Sudan grass was very close in feeding value to wheaten hay, and it was more palatable than the cereal hay, but the sowing of Sudan grass would very materially affect the crop that was sown on the same land in the succeeding year. Mr. H. Paech (Black-

heath) asked if stinkwort had any deleterious effect on the crop of wheat sown the following year, to which Mr. Spafford replied that stinkwort had no ill effect on the following crop, unless the growth of stinkwort was very heavy, and did not thoroughly decompose after the land had been fallowed, therby causing hollows in the land. Mr. E. Hunt (Morphett Vale) desired to know whether sheep could be used instead of a roller for consolidating the soil. "Yes," said Mr. Spafford, "if you can use the sheep in flocks of thousands and drive them backwards and forwards over the fallow; sheep as you all know soon make tracks going to and from drinking." If the sheep could be made to pack the soil like they did at a gateway, then he would say use them by all means. Mr. H. T. Torr (Redhill) asked whether Mr. Spafford would recommend the use of the sub-packer. South Australians, said Mr. Spafford, could show the Americans how to work land. The Americans were not good soil workers under low rainfall conditions, and they produced very few crops on land receiving under 15in. annual rain. South Australia had plenty of farmers making a good living on land that did not receive 10in. of rain per year. Messrs. W. Haynes (Georgetown), J. Darley (Narridy), and A. Jarvis (Berri) also referred in eulogistic terms to the valuable and comprehensive paper that Mr. Spafford had read to the gathering.

Wednesday Afternoon.

CONSERVATION OF FODDER ON THE FARM.

Mr. A. L. Molineux (Tarlee Branch), opened the proceedings by reading the following paper on this subject:—

To my mind one of the most vital questions the farmer has to face is—how best to conserve in times of plenty for the lean years that are sure to come. For this sunny land of ours, in some districts at least, is a land of feast and famine to a certain extent. We well know that if we have plenty of fodder this year the time of shortage may not be far away, and to be successful we must make provision for years when fodder is scarce. There are various ways of doing this. We can, when we get a heavy crop, cut more hay than we require and stack it for future use. This method has its disadvantages in the fact that mice play havoc with the stacks, although if cut green the loss by this means is not so severe. Still it is considerable, and further, the stock do not relish the mice infested hay. There is another disadvantage in this method, and it is one that the average farmer must take into consideration. In thus cutting into your grain crop for future use, you are also cutting into your year's income very considerably, and this, of course, is a grave matter to a man with limited capital. Then, even if we did cut for future use we are only human, and should the chaff merchant make us an offer of £5 a ton, we would probably sell and trust to Providence for the future, forgetting the fact that Providence helps only those who help themselves.

There is another method of conserving fodder which is deserving of notice. It is the conserving of grain in bulk, either oats or barley. Both these grains have a very high feeding value, and a comparatively small space is needed to store them in bulk. A small galvanized iron shed with a concrete floor would make a very reasonable granary; a shed 12 feet by 6 feet and 6 feet high would hold 100 bags in bulk. This method has one enemy and that is the weevil pest, which would make the holding of this grain for long periods an impossibility. Two years would be about the limit that grain could be kept in reasonable condition for economic feeding by this method. The weevil do not appear to affect the grain in any manner detrimental to stock. In my experience weevilly grain put through the crusher and fed to stock is taken quite readily by them. The only fault is the loss of feeding value caused by the weevil eating out the centre of the grain.

There is still another method of conserving fodder which, I venture to say, is deserving of the greatest publicity and which, to my mind, is invaluable to the farmer. I refer to cutting a portion of the crop and threshing it by means of a threshing plant. Of course I do not advocate treating the whole crop in this way, for in this sunny land of ours the quickest, cheapest, and most effective method of harvesting grain is by the combined harvester and its kindred machines; but I would strongly advise every farmer to cut a small portion of his crop and treat it in this manner. The resulting fodder is a great benefit to the stock. Horses and cattle do well on it, and in the time between the giving out of the stubble feed and the coming of the green feed it fills a big gap. It does away with the necessity for feeding hay to the young stock and cattle, which is a saving both of hay and work. Stock eat the fodder readily and keep their condition very well. If a stack of it could be placed conveniently close to the stable in a small paddock and the working horses allowed to have the free run of it after their last feed at night, they would appreciate the freedom and make good use of their stack as a dessert after their meal, as a shelter, and a bedding place. The horses would be in much better condition than if left tied up or shut in a stable yard. If there came a time of failure of crops, one of these stacks of threshed straw would be chaffed up, and with the addition of a small amount of grain, preferably crushed oats, the horse teams would be able to get through the seeding and fallowing without any undue hardship, and the farmer would not have to pay high prices for chaff to keep his teams at work. I admit that the task of chaffing the straw would not be a pleasant one; still it can be done, and in such circumstances would pay well.

Now we come to the important question, what varieties to cut for threshing? I would give first preference to oats for the following reasons:—Oats are always a tricky crop to harvest, and the loss by shedding by wind must amount to thousands of bags annually in the State. This loss is almost wholly eliminated by the method of cutting and threshing. No doubt most of you have had this bitter experience of losing the bulk of your oat crop by wind. My neighbor this year lost over four bags per acre in one windy day. My own oat crop being

already in the stooks was not affected by the wind. This alone meant a saving to me of nearly double the amount it cost to thresh the piece. So it paid well.

With regard to wheat varieties most suitable for threshing for fodder, the best are those in which the sugar contents of the straw are high. You will probably be surprised to hear that King's White and Le Huguenot are both excellent varieties for the purpose in view. The general idea is that these varieties are too hard and harsh in the straw, but cut in the right stage and passed through the thresher which pulverises the straw, the resultant stack is highly relished by the stock. Crossbred 53 is another good variety, and there are many others which yield splendid fodder; varieties such as Queen Fan, Onas and Federation are not of much value. If you do not care to cut into your wheat crop, there is always the barley crop; and here, as is the case with oats, you eliminate the risk of loss by wind, and although barley straw has not the same feeding value as other straw, still, in times of need it can prove very acceptable indeed to any class of stock, and they eat it readily. The quantity to cut and thresh depends upon your needs; if you put up one stack every year you should have enough on hand to see you through any time of stress. I find that two to three bales of string make a handy size stack; 12 yards by 10 yards or 12 by 12 yards is a very nice size to handle; a smaller stack has always a tendency to fall, and we found it paid to build up this size.

There are two points in building the stack to which I must draw your attention. Always put your elevator on the lee side of the stack. The reason for this is that any waste grain or husk and the finer particles of chaff are always found under or near the elevator, and the stock naturally eat their way into the stack from that side. Another point to keep in mind is to put your stack as high as possible; this will mean better protection from the weather, and the stack will not fall so easily when the stock eat their way under it. The thresher will deliver the straw and chaff separately if required, but for fodder purposes it pays better to run both together into the one stack.

Now we come to the question of cost. As a fair example, let us take the patch of oats we threshed this year; area, 23 acres; variety, Algerian; sown, 20th May; cut as straw turned color; twine used, two bales; estimated weight of stuff put through, 66 tons; oats cleaned, 966 bushels; time required, 3½ days, including setting up and dismantling plant, a few minor repairs, and fifteen minutes' travelling time each day. We worked under award rates and hours, not farmers' hours. Men required, eight—two in paddock, two on stack, and four at thresher. We found this the most economical team for a thresher of this capacity. Fewer men means harder work and less put through per day. Tonnage per day, 20; bags per day, 110. I would like to point out here that as fodder is the end in view, it is only tonnage that matters. If you want a big average of bags per day, take out your harvester and get them with that. Cost, including hire of engine and thresher, 8½d. per bushel, or approximately 12/3 per ton. Yield per acre, 42 bushels.

In conclusion, I would like to emphasize these points as the essentials of success. Cut your stuff at the right stage. Make your stack as high as possible and let it settle before turning the stock to it. A good plan is to keep the stock out until the nights begin to turn chilly, the stack will by that time have settled sufficiently. Cut only varieties yielding good fodder. A layer of straw over the stack will protect it from the weather, although this is not absolutely essential, as the rain does not appear to penetrate far, providing the stack is well built. A light sprinkling of salt would enhance the feeding value of the fodder. Do not keep your stacks on from year to year till half your farm is covered with them; use them—that is what they are for—use not ornament.

Discussion.

Mr. J. Gray (Claypan Bore) thought the estimate of 12s. 3d. per ton was very low, he estimated it cost 15s. to cart the straw and put it in the stack. He would build a strong post and rail fence around the stack to protect it from the animals, because he found they trampled on the straw without eating it when it was not protected. Mr. B. Cornish (Gumeracha) was in favor of stacking the straw. He said if the butts were placed on the outside with the sheaves straight, and the stack was thatched properly and built away from posts, that would help considerably in keeping out the mice because they entered the stack from either the top or the bottom. Mr. Torr (Redhill) advised farmers to co-operate when purchasing thrashing plants because they were expensive. Mr. H. Davis (Pinnaroo) said the farmers did not do justice to the conservation of fodder; on his farm he stacked as much as 50 tons per year. This year's stack would be carried over until next year, when another would be built. The varieties most suitable for stacking, he thought, were Le Huguenot and King's White. He made a practice of putting a small quantity of each over the fence each night for the stock. Mr. H. Jericho (Yadnarie) emphasised the importance of keeping only the best animals. He found that when timber was used as a foundation for the stacks the mice could gain an entry, so he used straw and secured much better results. Mr. W. H. Lang (Virginia) recommended the round stacks, and deprecated the practice of conserving the hay in sheds.

DAIRYING.

Mr. H. J. Apps (Government Dairy Assistant), then delivered an address on Dairying.

FREE PARLIAMENT.

The following resolutions were carried by the Congress:—(*a*) "That Branch members, travelling to the Winter School at Roseworthy Agricultural College, should be granted railway tickets at excursion rates." Mover, Mr. S. Ockley (Penola); seconder, Mr. W. A. Clifford (Penola). (*b*) "That the Education Department be asked to alter the date of the Michaelmas holidays to synchronise with show week,

so that country children might have an opportunity of attending the show." Mover, Mr. W. A. Clifford (Penola); seconder, Mr. S. Ockley (Penola). (*c*) "That it is desirable that legislation to provide for the compulsory registration of stallions should be introduced." Mover, Mr. M. P. Wilkin (Coomandook); seconder, Mr. W. H. Cuming (Strathalbyn). (*d*) "That in view of the importance of the wool industry to the State the Government be asked to appoint one or more wool instructors to be attached to the Department of Agriculture." Mover, Mr. N. S. Lillicrapp (Morchard); seconder, Mr. H. Robertson (Orroroo). (*e*) "That the necessary action be taken to prevent the destruction of timber on all roads of the State." Mover, Mr. H. Howard (Petina); seconder, Mr. E. Pitman (Wirrabara). (*f*) "That the Government be urged to evolve some scheme for planting trees on all suitable travelling stock roads and reserves." Mover, Mr. A. Badman (Yacka); seconder, Mr. C. Ricks (Cherry Gardens). (*g*) "That the plant known as "horehound" be proclaimed a noxious weed." Mover, Mr. J. H. Sargent (Gladstone); seconder, Mr. J. T. Bergin (Gladstone). (*h*) "That the Government be asked to enforce the regulations dealing with the compulsory spraying of orchards." Mover, Mr. C. Ricks (Cherry Gardens); seconder, Mr. W. H. Giles (Milang). (*i*) "That this Congress supports the Chamber of Commerce in its recent recommendation that the Chapman sack filled with grain be accepted by all handling agents regardless of weight." Mover, Mr. F. Pitman (Coonalpyn); seconder, Mr. A. E. Clarke (Crystal Brook). (*j*) "That all cornsacks in the same bale be made the same size." Mover, Mr. A. C. Greig (Marama); seconder, Mr. N. Sanders (Nunkeri and Yurgo). (*k*) "This Branch protests against the action of the Adelaide Steamship Company in raising the freights and fares on vessels trading between Spencer's Gulf ports." Mover, Mr. F. L. Johnson (Wudinna); seconder, Mr. D. B. Butler (Butler). (*l*) "That all motor cars and motor vehicles be registered in the district in which the owners reside and that the money be retained by the district councils for the repair of the roads in the same district." Mover, J. S. Hammatt (Lyndoch); seconder, Mr. M. P. Wilkin (Coomandook). (*m*) "That in the opinion of Congress the Fertilisers Act should be amended in such a manner as to require the guarantees to indicate the phosphoric acid content instead of the tricalcic content." Mover, Mr. J. R. Beck (Wynarka); seconder, Mr. A. Nash (Shoal Bay). (*n*) "That the Government be asked to expedite the allotment of dry blocks in the irrigation areas to overcome the shortage of wood supplies for settlers use." Mover, Mr. S. J. Randell (Lone Gum and Monash); seconder, Mr. E. R. Whitelaw (Lone Gum and Monash). (*o*) "That the position of Mallee Lands Instructor be filled." Mover, Mr. H. Howard (Petina); seconder, Mr. N. Sanders (Nunkeri and Yurgo). (*p*) "That dried fruit be carried on the railways at the same rate as fresh fruit." Mover, Mr. A. G. Milner (Waikerie); seconder, Mr. J. J. Odgers (Ramco). (*q*) "That instead of one-third of the members who are lowest in attendance at the meetings of the Branch being struck off the roll, only members who have failed to attend a certain

percentage, say, 5 per cent., of the meetings, be struck off at the annual revision of the roll." Mover, Mr. B. Cornish (Gumeracha). (*r*) "That this Branch urges on the Government the necessity for destroying noxious weeds on railway lines and Crown lands in the whole of the State." Mover, Mr. C. Williams (Minnipa); seconder, Mr. Hannigan (Wilmington). (*s*) "That the Government be asked to fix a standard for all spraying compounds, and that the manufacturers be required to conform to same." Mover, Mr. G. Brown (Williamstown); seconder, Mr. R. G. Morphett (Kangarilla).



ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Monday, September 10th, there being present Capt. S. A. White (Vice-Chairman), Professor Arthur J. Perkins (Director of Agriculture), Messrs. A. M. Dawkins, C. J. Tuckwell, and F. Coleman. Apologies were received from Messrs. H. Wicks and W. J. Colebatch.

Reappointment of Members.—Captain S. A. White, Colonel Rowell, Messrs. A. M. Dawkins, G. Jeffrey, W. S. Kelly, and W. G. Auld were appointed members the Advisory Board of Agriculture, by the Hon. the Minister of Agriculture, for a further period of two years.

Importation of Stud Stock from Great Britain.—A communication was received from the Prime Minister intimating that shipping companies had decided to reduce the freight on stud cattle between the United Kingdom and Australia to 40 guineas, and on sheep to 11 guineas each, the arrangement to be operative for a period of 12 months. The Secretary was instructed to obtain information from New Zealand regarding the conditions under which stud stock were imported from Great Britain.

Travelling Citriculturist and Viticulturist for River Murray.—At the recent Conference of River Murray Branches it was decided to ask the Government to appoint a travelling citriculturist and viticulturist for the River Murray districts. The matter was referred to the Chairman of the Irrigation Commission, who reported that Mr. W. E. Muspratt was appointed to carry out the duties referred to in the resolution. The Commission hoped to be able to relieve Mr. Muspratt from other duties which had prevented him from giving sufficient time to instructional work, and there would then be no need for the appointment of an additional officer.

Transmission of Cancer from Stock to Human Beings.—A resolution asking for a report on the possibility of transmitting cancer from stock to human beings was carried at the Conference of Upper Northern Branches. The matter was referred to the Chief Inspector of Stock (Mr. C. A. Loxton, B.V.Sc.), who reported that there was no possibility of man becoming affected with cancer by eating meat from the carcass of an animal so affected, or through contact with such an animal.

Delays in Railway Transit of Stock.—The Upper Northern Branches Conference also resolved "That the Advisory Board be asked to approach the Railways Commissioner, with reference to the delay in the carriage of stock on the railways." The Chief Railways Commissioner (Mr. W. A. Webb) to whom the resolution was submitted reported,—"Until the removal of the engine depot from Islington to Mile End, some three months ago, most of the livestock and goods trains finished at Dry Creek. This meant that at times, to small consignments of livestock consigned to Adelaide, a delay occurred at Dry Creek until a train was available to move the livestock from that station to Mile End, but in such cases the persons ordering the vans were informed of the probable delay at Dry Creek so that arrangements could be made to feed and water their stock. Since then, how-

ever, all livestock and goods trains finish at Mile End, and stock for Mile End and south thereof reach Mile End without the delay at Dry Creek."

Soil Surveys of Irrigated Land.—The Conference of River Murray Branches carried a resolution to the effect that before any land was thrown open for irrigation purposes a thorough soil survey should be made. The Chairman of the Irrigation Commission, to whom the matter was referred, stated that the Commission was fully aware of the importance of a soil survey prior to land being opened for irrigation, and would act accordingly.

Request for Draught Stallion.—The Kybybolite Branch requested that the Department of Agriculture be asked to station a good draught stallion at the Kybybolite Experimental Farm. The Board decided to refer the matter to the Director of Agriculture for a report.

Wheat Certificates.—Members were of the opinion that matters relating to wheat certificates being held by firms in payment of debts did not come within the scope of the Board. The Secretary was instructed to advise the Cungena Branch accordingly.

Bird Pests.—The Cherry Gardens Branch asked that a bounty be paid for the heads of Rosella and Blue Mountain parrots and starlings. It was decided that Captain White should visit the Branch and discuss the proposal.

Resolutions Carried at Southern Conference.—(*a*) "That the Government be requested to conserve the waters of the Finnis and Angas Rivers for irrigation purposes." The Board decided to transmit the matter to the Minister for his information. (*b*) "That the Stock and Brands Department be asked to enforce strictly the provisions of the Stock Diseases Act." It was decided to refer the resolution to the Chief Inspector of Stock. (*c*) "That the Advisory Board be asked to approach the Railways Commissioner, with the request that a moveable partition be provided in the trucks now used for the carriage of pigs and calves in the one truck." The Secretary was instructed to submit the resolution to the Railways Commissioner, with a request for a report on the matter.

Resolution from Lameroo Conference.—(1) "That the Advisory Board be asked to request the Government to offer a bonus for the eradication of take-all." On the suggestion of the Director of Agriculture, the Secretary was instructed to advise the Minister that whilst it did not support the resolution, members believed it would be desirable for the Vegetable Pathologist to supply regular progress reports of his investigations into the take-all disease. (2) "That this Conference desires the formation of a library of agricultural literature for the Branches of the Agriculture Bureau." The Secretary was instructed to formulate a scheme whereby the request of the Conference could be granted, and furnish a report at the next meeting of the Board.

Date of Next Meeting.—It was decided that the next meeting of the Board should be held on Tuesday, October 9th.

Life Members.—The names of Messrs. G. Holder (Watervale Branch) and J. H. Sargent (Gladstone Branch) were added to the Roll of Life Members of the Agricultural Bureau.

New Branches.—Approval was given for the formation of Branches of the Agricultural Bureau at Wookata, Bethel, McLaren Flat, and Pinnaroo (Women's). The following are the foundation members of the above Branches:—Wookata—F. E., T. F., S., B., and C. Gurney, E. J., A. J., and C. D. Oats, H. V. Hobbs, F. M. Underwood, J. H. Murray, F. C. Tomney, C. T. and R. N. Giles, J. Bastian, L. E. and R. Hardy, L. Walker; Bethel—T. H. and F. H. Gene, H. and R. Peltz, H. Linke, B. Winter, J. Daeke, H. and E. Vogt, F. Schmidt; McLaren's Flat—S., O., and R. Steer, F. Liddiard, J. Collins, R. B. Ottewell, F. and V. Bell, S., C., and G. Ward, E. S. Hockney, E. G. and J. E. Gill, T., E., P., S., and R. Elliott, F. and L. Townsend, N., F., and R. Low, H. Whiting G., A., E., and W. Hobbs, J. Knight, E. Brookman, G. Grant, W. Maidment, W. and H. Osmond, A. Crowder, J. Truscott, W. H. Rau, H. Elliott, R. Thorpe, R. J. and E. M. Trott, H. and K. Sauerbier, H. Powell, N. Charlton, W. Ashby, C. F. Schuller, C. Oakley, J. McPhie, A. Wickham, E. S. Bagshaw, C. Beale, C. Baxter, M. Gibson, F. R. Bruce, F. B. Wilson, K. Whiting, R., P., and W. Wait, G. Rowe, P. Penny, J. Ward, J. Mills, W. and J. Sigston, R. and W. Q. Nottange, G. Connor, C. Goldfinch, —Williams, L. Hussey, L. Weber, E. and C. Wickham, S. C. Thomas, S. Ledgard; Pinnaroo (Women's)—Mesdames H. H. Withers, A. Jordan, E. H. Leak, M. C. Symonds, H. Kirby, B. Edwards, H. Ledger, W. Muirhead, J. E. Symonds, F. Docking, A. Bennett, A. B. and P. H. Jones, McNeil, C. Lynch, Misses McDonough, Leach, L. Bennett, L. Casson, S. Klinger, C. M. Bennett, V. Jones, I. Fuller, E. Fuller, E. Leak, G. Gurridge, J. McKenzie, R. Casson, K. O'Loughlin, K. Kelly.

Branch to be Closed.—It was decided to close the Coorabie Branch.

New Members.—The following names were added to the rolls of the existing Branches:—Narridy—S. Freeman, E. G. Wright, O. Smart; Darke's Peak—J. Howard; Miltalie—P. Cranswick; Mount Schank —H. Habner, D. MacCuspin; Butler—E. J. Ferguson, C. C. F. Parker, V. A. Parker; Koppio—H. G. Meadows; Lone Pine—W. Schmaal; Warcowie—H. Jarvis, L. Jarvis; Kangarilla—S. Steer; Saddleworth (Women's)—Mrs. J. L. Severin, Mrs. J. Jamieson, Miss Scovell, Miss H. Coleman, Miss E. Frost, Miss J. C. Colebatch; North Booborowie—H. Dawson; Parilla—R. C. Kerley, —Venning; Wudinna—J. Woods, F. A. Miller, B. R. Bennell; Renmark—R. G. W. Lane; Tarlee—E. A. Luscombe; Pompoota—A. Hayward, L. Pettman; Eurelia—G. Wheadon, A. S. McPhee, A. Poldon, E. L. Bray, O. Schmidt; Berri—C. O. Scott; Watervale—F. Grace, jun., Chas. Grace; Kalangadoo (Women's)—Mrs. E. Dowdell, Mrs. N. McCall, Miss E. McCall; Yallunda—G. Olstan; North Booborowie—W. L. Brown; Amyton—E. G. Cook, W. H. Alsop, E. A. Thomas; Strathalbyn—C. H. Dunn, Rev. T. P. Wood, K. Harris; Rapid Bay—B. Willis, V. R. Chirgwin, C. Chirgwin, L. Morris, J. Morris, H. Jones; Block E—H. MacRae, R. Nenke, N. A. Buckenara, P. Muspratt, A. Heard, C. D. Davenport, F. Haycraft, O. Jungfer, G. Lacey, P. Smith, F. W. Fairweather, R. W. Civil, D. MacPhee, G. E. Brown, L. A. White; Paskeville—J. Petherick, L. Koch; Shoal Bay—D. Bell, K. Bates; Balhannah—A. James; Williamstown—S. Antwiss, F.

Gangel; Lenswood and Forest Range—P. Brown; Coomandook—A. S. Chapman, H. Chapman, N. McArdle, G. Ninnis, W. Saint, L. Brown; Brinkley—A. E. Burzacott; Tatiara—E. J. Buckley, Thos. Marshall; Netherton—A. S. Winton, H. N. Davis, J. A. Johncock; Monarto South—S. J. Harper; Collie—W. Hood; Big Swamp—R. Telfer: Elbow Hill—F. W. Ramsey; New Residence—H. Glatz; Claypan Bore—A. J. Millard; Cungena—W. Linquist, C. E. Feltus; Winkie—W. H. Swinstead, C. F. Brown; Two Wells—J. Cowan, J. H. Rowe; Lake Wangary—L. Fraser; Williamstown (Women's)—Mrs. A. Rowe, Mrs. J. Lane; Yadnarie—W. Hoffman, O. Hoffman, G. Dreckow; Rapid Bay—G. Stacey, R. Chambers, A. Bennett; Rockwood—W. T. Curnuck; Owen—J. F. W. Williams, W. F. Rogers, G. V. Barrett; Penola—J. Bott, G. Thompson; Morchard—H. Fullick; Coonalpyn—G. Vile; C. George, C. T. George, A. George, J. Brown, G. Gibbs, F. Russell, M. Young; Renmark—A. Robertson, L. Bennett, P. Johns; Talia—P. Fraser; Hookina—P. Fraser; Wepowie—F. W. Churcher, A. E. Matthews; Kongorong—N. Elliot; Mount Hope—D. Doudle, D. Speed, D. Myers, N. Ness, R. Speed, D. Wollaston, J. Phillips; Parilla Well—A. J. L. Guthleben, R. L. Hammond, R. F. Inglis.

THE AGRICULTURAL OUTLOOK.

REPORTS FOR THE MONTH OF SEPTEMBER.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective managers:—

Kybybolite.—Weather—The comparatively warm, dry conditions of late August continued for the first week of September. Since the 10th instant, however, rain has fallen practically every day, and very rough, boisterous weather has been experienced. Over 4in. rain have been registered for the month, an inch and a quarter above the average, and nearly 21in. have fallen for the year. Crops, with a few exceptions, are promising very poor. Barley and peas sown in August have germinated well. Some fallowing has been done, but land is now again too wet for working. Natural feed has received a check during these late squalls.

Eyre Peninsula.—Weather—There have been 132 points of rain for the month. Needless to say, this has been very beneficial to all crops. The weather has not been so rough as is usually the case in September, and in addition to this the good rains have more than counteracted what bad weather there has been. All crops are looking remarkably well. There is promise of some very heavy oat yields this year. Hay crops are assured, and there should be some quite good hay yields. Natural feed has made splendid growth this year. Stock—All in tip top condition and free from disease. Miscellaneous—Some of the neighboring farmers have some exceptionally early crops, and should be able to commence haymaking within a few days.

Turretfield.—Weather—This month has been exceptionally wet, the rainfall has been 412 points, floods have done much damage. Crops—The crops are very poor; a few have made a little improvement, but many have gone back, and give a very poor prospect for the coming harvest. Natural feed is not too plentiful, and like the crops, is suffering from excessive rainfall. Stock—In fair condition, but need finer weather to improve, the wet having held them back. Miscellaneous—A large area of last years' fallow has been reploughed again this year, and farmers are hoping to gain in crop yields next year.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, reported on October 1st, 1923:—

BUTTER.—The cold boisterous weather experienced during the month has had the effect of making the flush of the season some weeks later than usual. However, big quantities of butter are being marketed, and find good sales interstate, whilst the London buyers have also been more in evidence. Since our last report values of top grades have improved to the extent of 1½d. per lb., and a firming is also recorded in the lower grades. Choicest factory and creamery fresh butter in bulk, 1s. 5½d.; second grades, 1s. 4d. to 1s. 4½d.; best separators and dairies, 1s. 4d. to 1s. 5d.; fair quality, 1s. 3d. to 1s. 3½d.; store and collectors, 1s. 1d. to 1s. 2½d., according to quality.

EGGS.—Large quantities were marketed at each auction held, but were readily cleared by the strong demand which exists with interstate and local buyers, rates at the close of the month being fresh hen, 10½d.; duck, 11½d. per dozen.

CHEESE.—The values in this line have remained practically stationery, and although large parcels have been consigned from the South-Eastern factories, all coming forward have been readily absorbed by the good local and fair interstate sales, at the range of 1s. 2d. to 1s. 3d. for large to loaf.

HONEY.—In this State large quantities of all grades are being held in stock, as difficulty is being experienced in effecting sales; the interstate orders have only been for small parcels. During the month business has been put through at the following rates:—Prime clear extracted, in liquid condition, 3½d. to 4d.; best candied lots, 3½d. to 3½d.; lower grades from 2d. to 2½d., according to quality; beeswax readily saleable at 1s. 3½d. to 1s. 4d. for clear samples.

ALMONDS.—An improved demand exists for all classes of almonds, and consignments are meeting with ready quittance at slightly better values. Brandis, 10d.; mixed softshells, 9d. to 9½d.; hardshells, 4½d.; kernels, 1s. 4½. to 1s. 5d.; walnuts, 1s.

BACON.—An advance in price took place since our last report, as curers have not had large supplies of the live hog to operate on at the various markets. However, the sales have not been affected by the higher prices, for brisk demand rules. Best factory cured sides, 1s. 3½d.; hams, 1s 6d. to 1s. 6½d.; middles, 1s. 5d.; rolls, 1s. 1½d.; Hutton's "Pineapple" brand lard in packets, 1s. 1d.; in bulk, 1s.

LIVE POULTRY.—Fairly extensive catalogues were offered during the month. Buyers, however, have apparently disposed of their stocks on hand and exhibited keenness in purchasing their requirements, with the result that all consignments coming forward were readily cleared. We expect that these good rates will continue to be obtained for some markets to come, and strongly advise consignments (crates obtainable on application). Values at the close of the month were as under:—Prime roosters, 5s. to 7s. 6d. each; nice condition cockerels, 3s. 9d. to 4s. 9d.; poor condition cockerels, 3s. to 3s. 3d.; plump hens, 4s. 9d. to 6s.; medium hens, 3s. 8d. to 4s. 6d.; some pens of weedy sorts lower; geese, 7s. to 9s.; ducks, good condition, 5s. to 7s. 4d.; ducks, fair condition, 3s. 1d. to 4s. 9d.; turkeys, good to prime condition, 1s. 1d. to 1s. 6½d. per lb. live weight; turkeys, fair condition, 9d. to 1s.; fattening sorts lower; pigeons, 1s. 4d. each.

POTATOES.—During the month a good steady demand was experienced for best Victorian potatoes, which realised 16s. 6d. to 17s. per cwt. on trucks, Mile End.

ONIONS.—Best Mount Gambier dry onions selling at 7s. 6d. to 8s. per cwt. on trucks.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC.

IMPORTS.

Interstate.

Apples (bushels)	11,429
Bananas (bushels)	8,706
Oranges (bushels)	16
Passion fruit (bushels)	515
Pears (bushels)	40
Pineapples (bushels)	761
Tomatoes (bushels)	46
Beans (packages)	3
Carrots (packages)	100
Onions (bags)	1,197
Potatoes (bags)	16,592
Swedes (packages)	901
Bulbs (packages)	20
Plants (packages)	16
Seeds (packages)	59
Trees (packages)	15
Wine casks, empty (number)	3,772

Fumigated—15 packages trees, 37 wine casks.
Rejected—448 second-hand bags, 6bush. tomatoes.

Overseas.

Federal Quarantine Act.

2,246 packages seeds, etc.

EXPORTS.

Federal Commerce Act.

50 packages fresh fruit, 2,972 packages citrus fruit, 22,101 packages dried fruit, 15 packages preserved fruit, and 3 packages plants were exported to overseas markets. These were consigned as follows:—

London.

Dried fruit (packages)	17,544
Oranges (packages)	80

New Zealand.

Citrus fruit (packages)	2,888
Dried fruit (packages)	2,349
Plants (packages)	3

India and East.

Dried fruit (packages)	242
Preserved fruit (packages)	15
Oranges (packages)	4
Apples (packages)	50

South Africa.

Dried fruit (packages)	1,365

France.

Dried fruit (packages)	1

Vancouver.

Dried fruit (packages)	600

RIVER MURRAY HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR AUGUST, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during August.	Per Cow during August.	Per Cow October to August.	Per Herd during August.	Per Cow during August.	Per Cow, October to August.
			Lbs	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1/C	30·71	24·84	26317	856·95	8183·46	984·90	32·07	325·58
1/E	21·26	20·26	11980·5	563·52	6226·68	516·85	24·31	274·68
1/J	22	19	10101·5	459·16	5630·76	453·82	20·63	257·39
1/L	18	12	10493·5	582·97	6129·15	440·51	24·47	280·40
1/M	23	16·87	7741	336·56	5332·48	414·35	18·02	267·57
1/R	15·81	11·81	8490 5	537·03	5399·50	366·12	23·16	268·75
1/T	12	11·03	7580	631·66	5897·85	386·55	32·21	297·10
1/U	13·48	12·26	10095·5	748·93	7262·98	431·18	31·99	313·21
1/W	19	17·77	14148·5	744·66	6856·55	492·81	25·94	257·31
1/X	18	12·29	9118·5	506·58	5899·37	334·76	18·56	259·94
1/Y	24	18	15500	645·83	6817·69	609·58	25·40	290·03
1/Z	20	15·77	12086·5	604·33	5641·27	501·66	25·83	252·44
*1/AA	7	6	2852	407·43	6589·93	141·02	20·15	295·02
*1/BB	7·19	6·94	4171·5	580·18	5492·38	189·86	26·41	242·54
†1/Cc	17	17	10788	634·59	4183·58	452·63	26·63	179·67
‡1/V	14	14	6138	438·43	3958·78	294·72	21·05	177·79
Means	17·65	14·74	10475·16	593·39	6382·89	438·17	24·82	280·34

* Entered Association November 1st, 1922. † Entered Association December 1st, 1922.
‡ Entered Association February 1st, 1923.

COWS YIELDING 1,000GALLS. OF MILK OR 400LBS. OF BUTTERFAT DURING A LACTATION PERIOD.

Name of Cow.	Owner.	No. of Days.	Milk.	Butterfat.
			Gallons.	Lbs.
Pimple	C. J. Morris, Monteith	319	1020·45	454·50
Princess Royal	C. J. Morris, Monteith	268	1342·00	451·79

MOUNT GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR AUGUST, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.		Butterfat.	
			Per Herd during August.	Per Cow during August.	Per Herd during August.	Per Cow during August,
			Lbs.	Lbs.	Lbs.	Lbs.
2/A	20	9·74	7272	363·60	267·49	13·37
2/B	7·39	6·03	5956	805·95	196·45	26·58
2/C	18	16·10	9041·5	502·31	319·92	17·77
2/E	15	9·94	6228	415·20	250·35	16·69
2/F	21·55	21·06	12219·5	567·03	487·07	22·60
2/H	24	16·77	11307·5	471·15	413·51	17·23
2/I	12	6·42	4822	401·83	181·12	15·09
2/J	10	7·45	5909	590·90	209·69	20·97
2/K	21	14·06	8531	406·24	330·43	15·73
2/L	29·23	16·19	6608	226·07	282·20	9·65
2/O	35	25·13	16116 5	460·47	558·14	15·95
2/R	16	13·71	14200	887·50	548·33	34·27
2/S	5	4·32	3295	659·00	151·17	30·23
2/T	11	7	7378	670·73	302·35	27·49
2/U	16	8·71	8203	512·69	303·68	18·98
2/V	17	15·81	5547·5	326·32	256·74	15·10
2/W	11	11	9966·5	906·05	332·39	30·22
2/X	15	11·06	7538·5	502·57	274·18	18·28
2/Y	11	8·06	6555	595·91	271·32	24·67
2/Z	14	14	9393	670·93	379·81	27·13
2/Aa	22	12·19	6690	304·09	271·77	12·35
2/Bb	9	8·94	4940·5	548·94	169·21	18·80
2/Cc	12	11·32	4887	407·25	194·88	16·24
Means	16·18	11·96	7939·35	490·65	302·27	18·68

COWS YIELDING 1,000GALLS. OF MILK OR 400LBS. OF BUTTERFAT DURING A LACTATION PERIOD.

Name of Cow.	Owner.	No. of Days.	Milk.	Butterfat.
			Gallons.	Lbs.
Rosie	E. W. Tollner, Mount Gambier ..	299	952·35	480·26

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month of and to the end of September, 1923, also the average precipitation to the end of September, and the average annual rainfall.

Station.	For Sept., 1923.	To end Sept., 1923	Av'ge. to end Sept.	Av'ge. Annual Rainfall
Far North and Upper North.				
Oodnadatta	—	1·92	3·88	4·93
Marree	—	3·50	4·48	8·14
Farina	0·01	5·16	5·12	6·73
Copley	0 01	5·38	6·58	8·50
Beltana	0·04	5·93	6·93	9·65
Blinman	0·18	7·93	9·93	12·61
Tarcoola	0·05	2·49	5·93	7·91
Hookina	0·32	7·79	10·50	13·60
Hawker	0·54	10·50	10·21	12·93
Wilson	0·70	9·20	9·87	12·56
Gordon	0·67	6·46	8·92	11·60
Quorn	1·37	11·00	11·29	14·24
Port Augusta	0·41	5 87	7·53	9·68
Port Augusta West	0·41	5·54	7·65	9·74
Bruce	0·69	6·41	8·23	10·76
Hammond	0·86	10·01	10·24	11·90
Wilmington	1·61	15·23	14·79	18·44
Willowie	1·20	10·51	9·89	12·44
Melrose	2·12	22·08	18·01	23·88
Booleroo Centre	1·86	15·14	12·40	15·67
Port Germein	1·18	10·09	10·08	12·93
Wirrabara	2·47	17·20	15·88	19·85
Appila	1·98	13·09	11·71	15·01
Cradock	0·62	8·29	8·94	11·50
Carrieton	0·89	10·80	10·00	12 91
Johnburg	1·05	7·72	8·26	10·85
Eurelia	1·02	10·46	10·58	13·56
Orroroo	1·30	9·81	10·77	13·75
Nackara	0·51	5·92	9·45	11·85
Black Rock	1·22	11·97	9·90	12·73
Ucolta	0·60	6·18	9·46	12·10
Peterborough	1·39	12·47	10·44	13·53
Yongala	1·82	12·20	11·27	14·51
Lower North-East				
Yunta	0·25	3·84	6·59	8·93
Waukaringa	0·22	4·69	6·62	8·61
Mannahill	0·37	4·25	6·41	8·79
Cockburn	0·07	4·07	6·29	8·42
Broken Hill, N.S.W.	0·26	6·57	7·57	10·08
Lower North.				
Port Pirie	1·19	9·20	10·73	13·55
Port Broughton	2·41	12·23	10·60	14·27
Bute	2·92	14·76	12·85	15·80
Laura	2·44	16·79	14·52	18·25
Caltowie	2·14	15·49	13·46	17·19
Jamestown	2·93	17·28	14·02	17·86
Bundaleer W. Wks.	3·12	16·61	14·19	18·05
Gladstone	2·69	18·66	12·79	16·22
Crystal Brook	2·30	13·58	12·63	15·93
Georgetown	2·38	18·02	14·81	18·50
Narridy	1·66	12·83	14·17	16·43
Redhill	2·43	13·62	14·80	16·93

Station.	For Sept., 1923.	To end Sept., 1923.	Av'ge. to end Sept.	Av'ge. Annual Rainfall
Lower North—*continued.*				
Spalding	2·47	13·09	15·98	20·41
Gulnare	2·82	15·56	15·25	19·34
Yacka	2·32	12·88	12·39	15·45
Koolunga	2·24	12·49	12·68	15·87
Snowtown	2·56	12·46	12·99	16·05
Brinkworth	2·36	13·77	12·98	16·26
Blyth	2·33	14·91	13·52	16·96
Clare	4·20	25'28	20·05	24·60
Mintaro	5·00	26·84	19·09	23·40
Watervale	4·22	25·73	22·59	27·44
Auburn	4·45	22·01	19·75	24·30
Hoyleton	2·83	14·3b	14·25	17·85
Balaklava	2·47	13·07	12·86	15·91
Port Wakefield	1·71	10·93	10·79	13·29
Terowie	1·52	9·54	10·55	13·78
Yarcowie	1·63	9·09	11·13	14·18
Hallett	2·61	14·20	12·89	16·47
Mount Bryan	3·41	17·67	13·38	16·74
Kooringa	2·96	13·92	14·50	18·06
Farrell's Flat	3·41	17·99	15·35	18·97
West of Murray Range.				
Manoora	3·84	20·01	14·97	18·78
Saddleworth	3·48	19·00	15·86	19·74
Marrabel	3·79	23·68	15·85	19·67
Riverton	3·93	24·18	16·71	20·71
Tarlee	4·08	23·42	14·22	17·81
Stockport	3·57	21·74	13·08	16·49
Hamley Bridge	3·45	21·02	13·19	16·52
Kapunda	4·38	22·13	15·92	19·80
Freeling	3·85	21·65	14·25	17·90
Greenock	4·92	26·63	16·24	21·60
Truro	4·57	23·58	16·19	20·80
Stockwell	4·43	24·25	16·20	20·31
Nuriootpa	4·35	22·91	16·84	20·99
Angaston	4·45	25·96	18·10	22·48
Tanunda	4·95	26·82	17·99	22·20
Lyndoch	6·68	34·36	18·60	22·88
Williamstown	6·94	34·57	22·61	27·47
Adelaide Plains.				
Mallala	3·75	20·15	13·01	16·66
Roseworthy	4·65	22·10	13·82	17·29
Gawler	4·39	22·20	15·40	19·09
Two Wells	3·62	18·74	12·79	15 83
Virginia	4·17	21·38	13·91	17·31
Smithfield	4·60	23·89	13·70	17·16
Salisbury	5·80	26·10	12·71	18·45
North Adelaide	7·03	27·85	18·11	22·22
Adelaide	5·83	24·38	17·20	20·05
Glenelg	5·86	20·15	15·11	18·37
Brighton	5·53	22·99	17·39	21·34
Mitcham	6·08	29·34	20·52	24·06
Glen Osmond	7·23	32·72	21·23	25·78
Magill	7·37	33·55	20·75	25·24

RAINFALL—*continued.*

Station.	For Sept., 1923.	To end Sept., 1923.	Av'ge. to end Sept.	Av'ge. Annual Rainfall
Mount Lofty Ranges.				
Teatree Gully.....	6·06	36·43	22·50	27·65
Stirling West	10·39	55·23	38·84	46·59
Uraidla	10·06	53·94	36·91	43·92
Clarendon	6·95	36·19	27·37	32·98
Morphett Vale ...	5·51	24·31	18·68	22·79
Noarlunga	4·58	23·56	17·92	20·35
Willunga	5·55	27·39	21·56	25·89
Aldinga	4·49	20·65	17·12	20·35
Myponga.....	4·99	28·96	24·76	29·16
Normanville	4·81	23·74	18·29	20·61
Yankalilla.....	4·39	26·90	19·60	23·10
Mount Pleasant ..	7·52	35·35	22·47	27·16
Birdwood	7·05	37·04	24·16	29·33
Gumeracha	8·22	44·40	24·73	33·29
Millbrook Reservoir	8·64	45·81	—	—
Tweedvale	9·27	45·60	29·64	35·55
Woodside	8·14	38·14	26·61	32·11
Ambleside.....	8·75	42·03	28·64	34·67
Nairne	5·95	29·91	23·38	28·42
Mount Barker	7·46	38·44	25·72	31 18
Echunga	7·26	40·10	27·30	32·96
Macclesfield	7·07	32·90	25·07	30·57
Meadows	7·90	39·64	29·65	36·04
Strathalbyn	3·70	16·62	15·75	19·32
Murray Flats and Valley.				
Meningie	3·21	19·34	15·37	18·66
Milang	2·45	12·52	14·49	15·40
Langhorne's Creek.	2·61	14·12	11·65	14·61
Wellington	3·24	12·87	11·61	14·77
Tailem Bend	3·58	14·18	11·42	14·55
Murray Bridge ...	2·61	11·31	10·99	13·93
Callington	3·11	14·75	12·46	15·42
Mannum	2·55	9·26	9·33	11·64
Palmer	3·38	14·91	12·38	15·47
Sedan	3·01	12·39	9·89	12·29
Swan Reach	1·85	9·02	8·54	11·09
Blanchetown	0·72	4·78	7·78	10·16
Eudunda.....	2·13	14·95	12·90	17·54
Sutherlands	1·81	10·18	8·62	11·19
Morgan	0·93	6·21	6·94	9·30
Waikerie	1·13	6·31	7·41	9·91
Overland Corner ..	0·90	5·63	8·32	11·07
Loxton	1·78	9·16	10·01	12·63
Renmark	1·01	6·86	9·22	11·09
Monash	1·01	7·59	—	—
West of Spencer's Gulf.				
Eucla.....	0·42	4·79	8·53	10·02
White Well.....	0·39	4·51	7·18	9·06
Fowler's Bay	0·87	11·32	10·39	12·16
Penong	2·13	11·76	10·63	12·49
Ceduna	0·92	8·99	8·26	10·36
Smoky Bay	0·97	12·30	9·11	—
Petina	2·07	12·83	10·78	13·34
Streaky Bay.....	1·42	13·53	13·05	15·10

Station.	For Sept., 1923.	To end Sept., 1924.	Av'ge. to end Sept.	Av'ge. Annual Rainfall
West of Spencer's Gulf—*continued.*				
Talia	1·92	14·51	12·95	16·45
Port Elliston	1·87	17·02	14·24	16·55
Cummins	3·28	18·52	15·83	18·90
Port Lincoln	3·20	17·17	16·75	19·72
Tumby	2·49	10·75	11·68	14·76
Carrow	2·04	10 06	11·17	14·18
Arno Bay	1·84	10·01	10·46	13·30
Cowell	1·56	6·54	9·40	11·75
Yorke Peninsula.				
Wallaroo	2·39	12·23	11·68	14·18
Kadina	2·67	14·88	13·29	16·05
Moonta	2·72	13·78	12·68	15·38
Green's Plains	2·81	16 21	13·06	18·89
Maitland	4·56	22·44	16·65	20·15
Ardrossan	3·24	14·73	11·59	14·11
Port Victoria	3·92	18·21	11·86	15·47
Curramulka	3·74	18·29	14·96	18·22
Minlaton	4·03	20·88	14·85	17·91
Brentwood	3·55	17·80	12·81	15·83
Stansbury	4·64	19·88	13·98	17·04
Warooka	4·87	23·00	15·03	17·81
Yorketown	4·24	19·01	14·67	17·26
Edithburgh	6·02	19·35	13·71	16·58
South and South-East.				
Cape Borda.....	2·77	22·75	21·74	25·10
Kingscote	3·07	19·53	16·05	19·10
Penneshaw	2·77	15·58	15·82	19·39
Victor Harbor	3·03	18·74	17·69	21·45
Port Elliot	2·96	18·13	17·57	20·26
Goolwa	1·80	14·30	14·66	17·87
Pinnaroo	2·68	15·24	12·23	15·66
Parilla	3·02	14·62	11·35	14·65
Lameroo	3·73	16·77	12·66	16·37
Parrakie	2·76	14·42	11·35	14·54
Geranium	3·17	15·97	13·00	16·19
Peake	3·50	14·88	13·27	16·58
Cooke's Plains ...	4·89	17·64	12·02	15·04
Coomandook	3·13	14·45	13·99	17·48
Coonalpyn	3·46	17·63	13·88	17·42
Tintinara	3·19	19·40	14·78	18·60
Keith.....	3·46	17·86	14·40	18·17
Bordertown	3·34	17·94	15·24	19·44
Wolseley	3·42	19·43	14·37	18·12
Frances	3·58	20·00	15 26	19·78
Naracoorte	3·56	21·39	17·51	22·52
Penola	4·35	23·59	21·03	26·29
Lucindale	2·92	21·90	18·78	22·95
Kingston.....	2·33	21·18	20·99	24·47
Robe	1·80	21·75	20·86	24·59
Beachport.....	2·39	20·38	23·09	20·24
Millicent	3·46	28·75	24·58	29·36
Kalangadoo	4·79	30·81	—	—
Mount Gambier ..	3·76	24·62	25·15	31·24

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings	
		Oct.	Nov.
Alawoona	*	—	—
Aldinga	*	24	26
Allandale East	314	26	23
Amyton	282	22	26
Angaston	*	—	—
Appila-Yarrowie	*	—	—
Arthurton	*	—	—
Ashbourne	313	—	—
Balaklava	*	13	10
Balhannah	‡	19	23
Barmera	‡	22	19
Beetaloo Valley	*	—	—
Belalie North	*	20	17
Berri	308	24	21
Big Swamp	305	—	—
Blackheath	A.M.	26	23
Black Springs	287	—	—
Blackwood	‡	15	19
Block E	308	—	—
Blyth	‡	6	3
Booleroo Centre	‡	19	23
Borrika	‡	27	24
Brentwood	*	25	22
Brinkley	*	20	17
Bundaleer Springs	*	22	—
Bute	*	23	20
Butler	‡	—	—
Calca	*	—	—
Cadell	*	—	—
Canowie Belt	*	—	—
Carrow	‡	25	21
Cherry Gardens	313	23	20
Clanfield	*	—	—
Clare	*	19	—
Clarendon	*	22	19
Claypan Bore	306	24	21
Cleve	*	24	21
Collie	305	27	—
Colton	*	26	30
Coomandook	308	24	21
Coonalpyn	‡	26	23
Cradock	*	—	—
Crystal Brook	287	19	17
Cungena	‡	—	—
Currency Creek	‡	26	23
Cygnet River	‡	25	22
Darke's Peak	‡	6	14
Denial Bay	*	—	—
Edillilie	*	27	24
Elbow Hill	298	30	27
Eurelia	282	19	16
Farrell's Flat	‡	19	23
Frances	*	27	24
Gawler River	*	22	26
Georgetown	*	20	17
Geranium	*	27	24

Branch.	Report on Page	Dates of Meetings	
		Oct.	Nov.
Gladstone	‡	19	23
Glencoe	‡	—	—
Glossop	*	24	21
Goode	*	24	21
Green Patch	299	22	19
Gumeracha	*	22	26
Halidon	308	24, 27	24
Hartley	‡	24	21
Hawker	*	23	20
Hilltown	*	—	
Hookina	‡	25	22
Inman Valley	*	—	—
Ironbank	310	20	17
Kadina	*	—	—
Kalangadoo (Women's)	316	13	10
Kalangadoo	315	13	10
Kangarilla	310	—	—
Kanmantoo	*	20	17
Keith	*	—	—
Ki Ki	*	—	—
Kilkerran	294	25	22
Kimba	*	—	—
Kingscote	*	—	—
Kingston-on-Murray	*	—	—
Kongorong	‡	22	19
Koonibba	*	19	23
Koppio	‡	22	19
Kybybolite	*	25	22
Lake Wangary	300	20	17
Lameroo	*	26	23
Laura	‡	27	24
Lenswood and Forest Range	312	—	—
Light's Pass	*	25	22
Lipson	‡	20	—
Lone Gum and Monash	‡	24	21
Lone Pine	*	—	—
Longwood	‡	—	—
Loxton	*	—	—
Lucindale	*	—	—
Lyndoch	288	25	22
McLachlan	‡	6	3
McLaren Flat	‡	—	—
MacGillivray	‡	23	20
Maitland	*	25	22
Mallala	*	15	19
Maltee	*	19	23
Mangalo	*	—	—
Mannanarie	‡	—	—
Marama	306	22	22
Meadows	*	24	21
Meningie	*	—	—
Milang	313	13	10
Millicent	‡	6	3
Miltalie	‡	20	17
Mindarie	*	1	5

INDEX TO AGRICULTURAL BUREAU REPORTS—*continued.*

Branch.	Report on Page	Dates of Meetings. Oct.	Nov.
Minlaton	*	19	23
Minnipa	*	24	21
Monarto South	307	—	—
Moonta	‡	19	23
Moorak	316	25	22
Moorlands	*	—	—
Moorook	308	26	22
Morchard	282	20	17
Morphett Vale	313	25	22
Mount Barker	‡	24	21
Mount Bryan	*	—	—
Mount Byran East	*	—	—
Mount Compass	*	—	—
Mount Gambier	‡	13	10
Mount Hope	‡	20	17
Mount Pleasant	314	—	—
Mount Remarkable	*	—	—
Mount Schank	*	23	20
Mundalla	*	24	21
Murray Bridge	308	16	20
Mypolonga	‡	22	19
Myponga	*	—	—
Myrla	*	20	17
Nantawarra	*	25	22
Naracoorte	‡	13	10
Narridy	*	27	24
Narrung	314	27	24
Neeta	*	—	—
Nelshaby	*	20	17
Netherton	308	19	—
North Booborowie	286	23	—
North Bundaleer	*	—	—
Northfie'd	*	—	—
Nunkeri and Yurgo	*	7	4
O'Loughlin	299	24	21
Orroroo	A.M.	20	24
Owen	294	19	23
Parilla	308	19	23
Parilla Well	‡	22	26
Parrakie	*	—	—
Paruna	*	—	—
Paskeville	298	19	23
Pata	*		—
Penola	‡	6	3
Petina	‡	27	24
Pinnaroo	*	26	1
Pompoota	*	10	14
Port Broughton	*	19	23
Port Elliot	314	17	21
Port Germein	*	27	24
Pygery	*	20	21
Ramco	‡	22	19
Rapid Bay	312, 314	6	3
Redhill	287	23	—
Rendelsham	*	24	21
Renmark	‡	25	22
Riverton	*	—	—
Riverton (Women's)	*	—	—
Roberts and Verran	301	25	22
Rockwood	311	22	19
Rosedale	‡	—	—
Rosy Pine	*	—	—
Saddleworth	288	—	—
Saddleworth (Women's)	*	9	13
Salisbury	290	2	6
Salt Creek	*	—	—
Sandalwood	*	—	—
Shoal Bay	‡	23	20
Smoky Bay	302	—	—
Spalding	*	—	—
Stockport	*	—	—
Streaky Bay	*	—	—
Strathalbyn	*	23	20
Talia	‡	8	12
Tantanoola	*	20	17
Taplan	A.M.	23	20
Tarcowie	286-7	23	20
Tarlee	290	16	—
Tatiara	316	20	17
Tweedvale	*	—	—
Two Wells	294	—	—
Uraidla & Summertown	*	1	5
Veitch	*	—	—
Virginia	*	—	—
Waikerie	*	—	—
Wall	*	—	—
Wanbi	*	—	—
Warcowie	282	—	—
Watervale	294	—	—
Weavers	296	22	19
Wepowie	‡	23	20
Whyte-Yarcowie	*	—	—
Wilkawatt	308	20	18
Williamstown (Women's)	*	3	—
Williamstown	294	19	23
Willowie	‡	24	21
Wilmington	*	24	21
Windsor	‡	23	—
Winkie	308	22	19
Wirrabara	*	20	17
Wirrega	*	—	—
Wirrilla	*	20	17
Wirrulla	‡	20	17
Wolowa	*	—	—
Wudinna	‡	20	17
Wynarka	‡	—	—
Yabmana	*	—	—
Yacka	*	23	20
Yadnarie	305	23	20
Yallunda Flat	302	—	—
Yaninee	*	—	—
Yeelanna	306	20	17
Yongala Vale	*	—	—
Yorketown	*	—	—
Younghusband	‡	25	22

* No report received during the month of September. ‡ Held over until next month. † Formal.
A.M. Annual meeting.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

EURELIA.

August 18th.—Present: 13 members.

CULTIVATOR *v.* PLOUGH FOR FALLOWING.—In the course of a paper dealing with this subject, Mr. E. H. Hall first referred to the time that was saved where a cultivator instead of a plough was used for fallowing. In such cases an eight-horse team was able to work a 13-tyne cultivator which turned over 6ft. 6in. of land, but the same team working a five furrowed plough would only turn over a strip of land 3ft. 4in. in width. He advocated working the cultivator at a depth of 3in. The cultivator made a good job of pulverising the soil, which caused a good germination of weed seeds. The speaker was of the opinion that a farmer working a cultivator would be able to fallow 300 acres of land whilst the man using the plough would only be able to deal with 200 acres. In the discussion that followed, Mr. Brown favored the plough, because that implement made a better seed bed than the cultivator. Mr. Page said he had observed the method of fallowing adopted by Mr. Hall for a number of years, and he had now come to the conclusion that the cultivator was the better implement to use. An interesting report on the growing of Hubam clover was given by Mr. Page.

MORCHARD (Average annual rainfall, 13.50in.).

August 25th.—Present: 16 members and five visitors.

FARM HANDS AND FARM LABOR.—Mr. P. C. Schultz, who read a paper under this heading, was of the opinion that the securing of suitable labor was becoming a very serious question to the farmer. He also thought that the farmer would be compelled to pay higher wages for a shorter working day. The young men and immigrants at present working on the farms should be taught to do their work more quickly and to adopt better methods of going about the work. Every encouragement should be given to the young men to remain on the land, and should they make mistakes, they should be corrected in a kindly manner. The young man in the city had many advantages over the youth in the country, and farmers who employed young men should bear that point in mind, and remember that the man that they treated with respect would be the man from whom they would obtain the best work. Mr. C. Halliday read an article dealing with the determination of the age of sheep by their teeth. An interesting report was also given of the recent trial of tractors, held under the auspices of the Whyte-Yarcowie Agricultural Bureau.

AMYTON, August 20th.—The meeting discussed the subject, "The Importance of Country Roads." The Hon. Secretary (Mr. L. N. Mills) presented the Annual Report, and the officers were elected for the ensuing year.

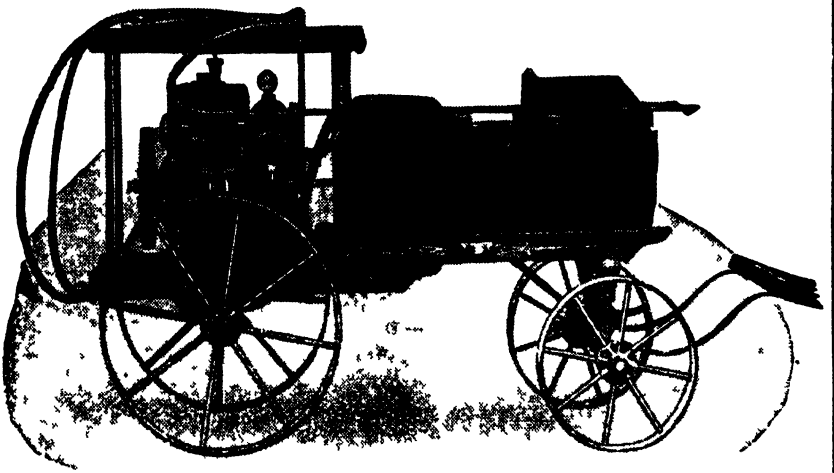
WARCOWIE, August 24th.—Mr. A. Telfer delivered an address, "Classification of the Farmer's Clip," and gave a demonstration of woolclassing. An interesting discussion followed. The annual meeting of the Branch was held on August 2nd, when the officers were elected for the ensuing term.

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MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

CRYSTAL BROOK (Average annual rainfall, 15.62in.

August 24th.—Present: 17 members.

ECONOMICAL PROBLEMS IN FARMING.—A paper was contributed by the Hon. Secretary (Mr. H. K. Lock). After having discussed the effects which the shortage of farm laborers had had on the farming practices of the State, Mr. Lock continued:—"With the cutting up of large estates for closer settlement, and the consequent high prices ruling for land, the farmer must of necessity obtain greater returns off smaller areas. To do this, he has improved his methods of farming to such an extent that is it now practically a science. Every care is taken in cultivation, seeding and reaping to obtain the greatest returns. The advent of superphosphate and other artificial manures has enhanced the farmers' returns, and with modern machinery and implements, it is possible to handle a 400 to 600 acre farm on his own and ensure a good livelihood. This necessitates a rotation of bare fallow and wheat, with no land lying idle. By this method a farmer gains a good return for his labor, but necessarily lowers the cropping value of his soil, not so appreciably, however, as before the advent of artificial manures. On a farm of this size it is possible to work it with one good team of horses and big implements, the farmer then being independent of labor. The continuous cropping of the land has led in some districts to dispensing with the plough and using in its place a disc or tyne cultivator. This is contingent on the nature of the soil to be worked and the time of the year such cultivation is to be done. It is obvious, however, on land that is inclined to run together and is hard, there is only one implement, the plough, to break it up for cultivation. The other method may, however, be cheaper and just as efficient in certain districts. Then the scarifier and tyne cultivator is being replaced by the large spring tyne cultivator, the contention being, that land worked over three times with the spring tyne cultivator is preferable to land worked only one or twice with the ordinary cultivator. This again is contingent on the soil and the time of the year the work has to be done, but it makes possible the cultivation of large areas of land at little cost, with one team of horses. Again, at seed time the combined drill and cultivator is replacing the ordinary drill and cultivator with marked success, both from the point of view of efficiency and saving of time and labor. A 10-horse team on a 17 to 20 tyne combine can do more and make a better job than two teams on separate implements, at a saving in expense of one man and a number of horses. Furthermore, it is claimed by many users of the "combine" that better returns are obtained. In the matter of harvesting machinery there is a marked improvement. The bigger combs and improved threshing machinery have made it possible to harvest almost any crop expeditously and with very little waste. A farmer to-day equipped with a modern 8ft. or 9ft. thresher can comfortably handle a 300-acre crop. This was impossible with the old types of machines. It is seen, therefore, that a farmer to-day can be independent of labor. I do not say it is wise to avoid employing labor, for it would be false economy if a farmer were to avoid employing labor, and by doing so have hundreds of bags of wheat damaged by weather because they had not been sewn and carted. On the price of wheat that has been ruling, there is a reasonable margin of security, but should the price fall to pre-war level, that is round about 3s. 6d. per bushel, a farmer is on doubtful security, and every care must be taken to handle the produce at an absolute minimum. In some districts the price of wheat does not affect the farmer so much as he handles his crop as hay, but in this district it is only exceptional conditions that would necessitate having to cut the crops for hay. In cases where the crops contain abundance of rubbish, or where a crop is showing signs of imperfections, such as heads breaking off, &c., then the farmer has no option but to cut his crop of hay and, incidentally, to take just what the chaff merchants care to offer. It seems to me than in semi-dry areas, such as the middle-north and the drier mallee districts, where the scarcity of rain results in a very small development of straw, it is false economy to grow wheat for hay other than to meet one's own needs. I go so far as to say that a farmer is sacrificing his return by so doing on the present price of wheat. Take, for instance, last season. Some hundreds of tons of hay were delivered to chaff merchants in this district at £2 10s. per ton. The crops would not probably have averaged more than 20cwt.

to the acre, being a return of £3 5s. per acre. To harvest this crop and deliver the hay to the mills entails heavy labor, the hay having to be cut, stooked, and carted. On the other hand the crops cut would have yielded between six and eight bags of wheat per acre,—say, seven at 5s. per bushel would bring a return of £5 5s., labor entailed being less—reaping, sewing, and carting. Even if labor were equal it would still show a balance of £2 per acre in favor of wheat. This does not apply where a farmer has no alternative but to cut his crop for hay, but it shows the fallacy of trying to market a crop as hay in districts where there is not a sufficient rainfall to ensure prolific growth of straw. This is more pronounced in districts where new land has to be worked, and where the average return is less than, say, five bags per acre. In such districts where the rough conditions of the paddocks and the scanty growth means cutting large areas to provide sufficient hay for the following year, mechanical haulage is a great boon. In certain areas of the State the water problem is a great drawback, and when an exceptionally long summer is experienced it is a difficulty to keep even sufficient stock for the needs of the settler. In such circumstances there is no doubt that the tractor will eventually supersede the horse team to a large extent, and in many cases be the salvation of many farms which to-day are practically useless. Even in the more settled areas, keen interest is being manifested in the advance of various types of mechanical haulage. Many of those who have purchased tractors have had good results with them, whilst others have not. As to whether they will successfully replace horse teams or even work in conjunction with them has yet to be proved. First of all there is the type used; secondly, the man who uses it; thirdly, the conditions under which it is used; and fourthly, the amount of abuse that it receives. There are those who even go so far as to say that tractors will never be a success. There were those who scoffed at the use of artificial manures. The trouble is simply this, we have always relied on horses for farm work, and have reckoned out our problems in horses, and it is therefore impossible for many farmers to overcome that condition and think mechanically; due, naturally, to the fact that they know all about horses and nothing about tractors. The time is within our knowledge when motor cars were a novelty. To-day hardly a farm is without one, and no one would gainsay that the car is a universal convenience and a necessity in many cases. So it is with the tractor. No one would give up his car and take on a four-in-hand coach as a matter of preference or convenience, and so the time will come when few will care to forego their tractors and take on a 8 or 10 horse team. I wish to place before you a few simple facts concerning tractors in preference to horses. You are all familiar with the drudgery of farming in relation to the incessant labor and tediousness in regard to team work, and the enormous annual expense in horse feed. In passing, let me remark on the latter. Two well-to-do farmers in this district informed me that one who crops between 400 and 500 acres annually pays away £500 in horse feed. The other considered his feeding cost at least £600. The ruling price for contract work in this district is approximately 7s. 6d. for ploughing, 1s. 6d. for cultivating, and 6d. for harrowing. My experience with a tractor works out at ploughing 2s. 1d., cultivating 7d., and harrowing 2½d. Add labor to these figures and they are considerably less than half, besides which the tractor costs nothing when idle. There is of course, the relative depreciation between the tractor and the horse team, which is contingent on many circumstances, and it is difficult to obtain an estimate. For instance, one man would drive his tractor successfully for ten years, whilst the same tractor in the hands of another man would not run for three years. One must be prepared to write off a certain amount of depreciation and allow for breakages, but on the other hand, horses do not live for ever, and a farmer must always have nine to ten horses to keep an eight-horse team going, and at the same time be prepared to loose one or more every year. Nor does the horse labor include the overtime every farmer spends in feeding up and other attentions. Summing up, the position is that with efficient mechanical haulage, a farmer is able to obviate much of the drudgery, at the same time be more independent of labor and able to work his land far more cheaply than at present. There is also a further factor, and that is that an efficient tractor has more scope, for not only do they travel faster, but are capable of doing more continuous work. Instead of being able to work 300 acres per year with an eight-horse team, one is able with a tractor of equivalent strength to do half again as much. There must, however, be a period of trial through which

the tractor must pass. There are many imperfections in the various types at present on the market and many difficulties have to be overcome before their use is universal. A few points that one must take into consideration in choosing a tractor are flexibility, simplicity in construction, efficient haulage power, economy in operation, and durability. There is also the matter of finance, for however well a farmer may work his property, if he does not buy and sell well then he is not successful. Summing up, a farmer should obtain the greatest returns from his land, in the cheapest manner with up-to-date machinery, and know how best to dispose of his goods when he obtains them."

NORTH BOOBOROWIE (Average annual rainfall, 16.35in.).
August 21st.—Present: six members.

THE BOY ON THE FARM.—Mr. R. Dawson read a paper dealing with this subject. In spite of the good wages that could be obtained by farm hands, he said it was a difficult matter to induce young men to leave the city and go out to work on a farm. If the lad were successful in obtaining employment with a good farmer, work on the land had many advantages over city life. In the first place, good wages could be earned and the living expenses were not nearly so heavy. A good lad should receive every encouragement from the farmer to stay on the land. The boy would be certain to make mistakes, and the farmer should correct the lad in a kindly manner. The sensible lad would realise that during the busy seasons of the year it was not convenient to have afternoons off for sport and recreation, but during the slack times of the year the lad should be given time off to indulge in cricket, football, shooting, or some other form of recreation. The lad should be allowed to keep a horse on the farm, and if he did not have one, his employer should be willing to allow him the use of a saddle hack. Mr. F. Clark, in opening the discussion, considered it would be a good plan to advertise the advantages of farm life in the city schools. Mr. R. Gniel said many farmers made the mistake of expecting the boy to perform as much work as a grown man. If the boys were to be kept on the land, it was imperative that the farmers should exercise patience and teach them the best methods of doing the work in connection with the successful management of the holding.

TARCOWIE (Average annual rainfall, about 15½in.).
July 24th.—Present: 19 members and three visitors.

FARM TRACTORS.—Mr. W. S. Ninnes, in the course of a paper dealing with this subject, said since the year 1914 remarkable strides had been made in the progress of agricultural tractors, until at the present time the tractor could be worked under almost any condition, driven as easily as a motor car, and worked more economically than a team of horses. The writer, however, was of the opinion that the time had not yet arrived when the horse could be entirely dispensed with on the farm, but the farmer who employed two or more teams of horses could, with advantage, dispose of all the horses except one team and purchase a 20 horsepower tractor. The stationary engine that was used for chaff cutting, wood sawing, &c., could also be sold, and the tractor engine used in its stead. An average year's work for a team of 10 horses (valued at £25 per head, £250) would be to fallow, harrow, cultivate, sow, and reap 250 acres. In doing that, and allowing that the horses would be running in the paddock for two months, they would have consumed about 50 tons of chaff, which, at the present price, £5 per ton, would mean £250, or £1 per acre. That amount of work could be done more cheaply with a tractor. Fallowing at 3s. per acre, £37 10s.; harrowing at 1s. per acre, £12 10s.; drilling at 1s. per acre, £12 10s.; reaping at 2s. 6d. per acre, £31 5s.; interest on £500 at 6 per cent., being difference in cost of tractor and team, £30; making a total of £130—a balance in favor of the tractor of £120. If necessary the tractor would be capable of getting over a far greater area. Another point in favor of the tractor was that one did not have to feed up after tea, or get up early in the morning to feed and groom the team, nor walk about in a dirty yard putting on harness. A tractor would work almost continuously throughout the day, while the horses had to be fed and rested. After heavy rain, one would have to wait perhaps a couple of days longer before starting with the tractor than with the horses. Such loss of time, however, could easily be made up by working long shifts, or at night, if necessary. The fallow would also be in better order after an extra day or two in which to allow the excessive moisture to soak away. In

the next few years he believed that it would be proved that fallowing could be done more easily, more cheaply, and more quickly with the tractor than it could with horses.

REDHILL, August 24th.—The Wool Instructor of the School of Mines (Mr. A. H. Codrington) attended the meeting and gave a woolclassing demonstration and address to a gathering of 17 members and five visitors.

TARCOWIE.—A meeting was held on August 21st, when papers dealing with the subjects "The Blowfly Pest" and "Useful Hints" were read from the *Journal of Agriculture*. An interesting discussion followed, in which Messrs. W. S. Ninnes, J. Ninnes, G. Watkins, and O. W. Davidson took part.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BLACK SPRINGS.

July 26th.—Present: 17 members.

THE FARMER AND HIS SONS.—In the course of a paper under this title, Mr. O. Mann expressed the opinion that when the lad left school he should be given some tangible interest in the working of the farm. For instance, the young man should be given, say, five bags of wheat out of every hundred produced on the farm, and that amount could be increased every year. That would encourage the lad in his work, and make him more careful, because he would realise that the better he worked the land the more wheat would be produced, and he would benefit accordingly. The father should not allow his son to squander the money, but sufficient pocket money should be given to the lad, and the remainder could be banked. The speaker also thought that before any new implements were purchased the father should take his son into confidence, and discuss the merits and demerits of the various implements, so that the most suitable might be purchased. On the other hand, if the lad showed no inclination to work on the farm, and no liking for the work, he should be allowed to learn a trade.

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LYNDOCH (Average annual rainfall, 23.01in.).
August 23rd.—Present: 18 members.

VITICULTURE.—In the course of an address dealing with this subject, Mr. J. G. Kelly first dealt with the question, "What to Plant." The speaker said he would not suggest any one or more varieties of vines to intending planters. He advised the planter to find out the varieties grown in his neighbourhood, and to be guided by the varieties that had thus been tried and proved successful. *Distances to Plant.*—Mr. Kelly was strongly in favor of close planting. He gave instances, together with yields per acre, of close planting. He favored 10ft. by 4ft. *Trellis* v. *Bush.*—For the majority of varieties he favored trellising. He had found larger crops and better fruit on the trellis, with the added advantage in cultivation. *Fertilisers.*—The speaker was strongly in favor of liberal applications of manures. If stable manure were available, it should be carted direct from the stables and spread on the land. If the ground were heavy, a liberal supply of lime would prove most beneficial. Mineral superphosphate was an essential manure. *Application.*—After ploughing, lime should be placed on the surface of the land and then worked in with the harrows. Most manures should be ploughed or drilled in deeply, early in the winter. Sulphate of ammonia, however, should be applied at a shallow depth early in the spring. The speaker strongly advocated experiments with various fertilisers, because that was the only method by which the grower could be certain that he was applying the manure that was most suited to his class of soil. *Cultivation.*—The first ploughing should be done in the winter, and a crown formed in the centre of the row. The second ploughing should be done in the spring, the soil being ploughed towards the vine, and the cultivator used frequently well into the summer. A fine tilth should be kept on the surface of the soil to conserve as much moisture as far into the summer as possible. *Pruning.*—Certain practices were essential, according to the vigour or weakness of the individual vine. Pruning could be simplified if time were taken to dis-bud water shoots, &c., early in the season. The speaker strongly deprecated the practice of "topping." It weakened the vine and lessened the coming crop. It was a mistake to turn stock into the vineyard whilst there was any green color showing on the leaves. Mr. Kelly also gave much interesting information of his experiences in the vineyards of Italy and France.

SADDLEWORTH (Average annual rainfall, 19.69in.)
July 27th.

BREEDING AND REARING FAT LAMBS.—The following paper was read by Mr. C. Pellew:—"In the breeding and rearing of fat lambs on the farm, the first and main point to decide is what breed of ram and ewe should be mated to give the most profitable lamb. There is no doubt that the Merino ewe is best suited for this district, because the value of its fleece far outweighs the advantages of a Lincoln-Merino or Leicester-Merino half-bred ewe, namely, better mothering qualities and capacity to throw a larger framed and more quickly maturing lamb, especially as the half-bred or crossbred is more difficult to obtain and has no respect for fences. In the case of the ram, the fleece is of minor importance on account of the small number required on the farm—one to every 40 to 50 ewes—and the qualities that are aimed at are early maturity and a large and well proportioned frame. The rams chiefly used at present are the Southdown, Shropshire, Leicester, Dorset Horn, and Merino, and in respect to the two main points mentioned above, I should place the Dorset Horn first. The lamb produced from this cross grows a big frame, is shapely, and matures very quickly; in fact, dropped at the same time and on the same pasture, I should say a four months old Dorset Horn-Merino lamb would be quite as heavy as a five months old Merino, especially if dropped late, or in cold weather. The rams can be put in the flock at one or more day intervals any time after the beginning of November, and may be left in from three to six weeks, depending on the number of rams used. If put in too early, there is always the risk of a shortage of succulent food at lambing time. On the other hand if the rams are put in early in November the lambs will be dropped early in April, and as that time of the year is generally warm, there will not be such heavy losses from cold weather and foxes. The ewes should be crutched in February or March in order to minimise trouble from flies during lambing, care of course being taken not to throw the ewes about too violently while the cleaning up is in progress. To give the best results, the ewes should be in good condition, but

not fat, when lambing is due, and plenty of water should be available, especially if the sheep are on dry feed. With the Dorset Horn, in common with other large-headed rams, the tendency is to throw a large-headed lamb, hence there is a danger of trouble with the ewes when lambing. In my short experience, however, the trouble so caused has been practically nil. If possible, lambing should take place somewhere handy to the homestead, and the flock should be visited at least twice a day in case a lambing ewe needs assistance. Frequent visits to the flock will save many lambs, especially from crows and hawks, both of which kill numbers of lambs by pecking their eyes out soon after the lambs are born. Foxes also are a great source of annoyance and loss. The only remedy for this pest seems to be constant and organised poisoning by means of baits. The lambs should be tailed when not more than four weeks old, preferably about two, and in the case of males they should be castrated at the same time. The knife is in my opinion better than the searing iron, more particularly if the lambs are tailed when young, and very little check in growth should then take place. Naturally, the better the feed the quicker will be the growth of the lambs, and most farmers, I am afraid, rely too much on natural pasture to fatten the lambs. When it is realised that forage crops such as rape, barley, peas, and rye give many times the quantity of feed that natural pasture does, it is surprising that these crops are not more largely grown for feed on land that is lying out. Not only can we extract higher returns per acre from forage crops, but the soil is greatly improved for the succeeding wheat crop, on account of the larger amount of organic matter deposited in the soil by the sheep. Speaking generally, lambs should be ready for market at from four to six months old, and, if prime, will show a handsome return for the really small amount of time and trouble necessary to rear them."

SHEEP AS AN ASSET ON THE FARM.—In order to improve in a concrete manner the value of sheep on the farm, the following paper, setting out his experiences in handling the flock, was read by Mr. W. G. Crawford:—"In September, 1916, we were renting 230 acres of land at 10s. per acre, in addition to our own holding of 350 acres, making an area of 580 acres, and on the above date we purchased 40 ewes and lambs, and I have kept a strict account of income and expenditure up to the time we disposed of the whole flock in June, 1922. In December of 1916 we purchased another 50 Merino ewes, and still later on 45 Merino ewes, making a total of 135 ewes. However, in November, 1918, we disposed of 50 ewes and 22 had died or strayed during the period under review, so that at the end we had only 63 ewes left. In November of the first year we mated the ewes to two Dorset Horn rams, the total cost of the 135 ewes and two rams being £236. Our total expenses for shearing, sheep dip, tailing, labor, woolpacks, etc., was £30 9s. 3d. In 1918 we had to resort to hand feeding for a few months, and we fed to the sheep 4½ tons of chaff at £4 per ton, making a total outlay, including the initial cost of the flock, £284 9s. 3d. During the 5½ years we have received for wool and skins £337 0s. 1d., for ewes sold at different times £120 8s. 9d., and 498 lambs for £491 12s. 1d., an average of 19s. 8d. nett per lamb showing a nett profit of £664 11s. 8d. on the whole transaction for approximately

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5½ years. This is equal to over £120 per year profit on 100 ewes, and there may still be another one or two dividends to come on wool. The only labor not taken into consideration was the shifting of the flock from one paddock to another. The sheep received very little attention either at lambing or any other time, and they were always grazed on fields that were first fed off by cattle and horses."

SALISBURY (Average annual rainfall, 18.57in.).

August 9th.—Present: eight members.

CONSTRUCTION AND MAINTENANCE OF ROADS.—Mr. F. C. Fleet, who read a paper dealing with this subject, said when an earth road was being formed care should be taken to use soil that contained sand for the surface covering. Drains should be provided to carry the water from the centre of the road. The earth should be spread evenly, and then rolled with a heavy road roller. A plough and scoop and a team of horses were the best and most expeditious method of preparing earth roads. To form the foundation for a metal road the soil should be taken from the sides of the road and placed with an even grade towards the centre. If a depth of 10in. of metal was placed on the road it should be able to carry loads up to about 10 tons. A shoulder of a similar depth would also be required to support the metal. If circumstances would not permit of the latter plan being carried out, soil should be applied to prevent the metal from spreading. The foundation should be rolled before the metal was applied. It was sometimes advisable to form the road with earth and allow it to stand for a season before applying the metal. The bottom layer should consist of metal of a coarser grade than that used for the surface. For the bottom he suggested 6in. metal, and for the top 2½in. The centre of the finished road should have a crown of, say, ¾in. to the foot, so that a 14ft. road would have a drainage fall of about 5in. on each side of the road. Quarry screenings he considered to be the best material for binding, and the roller should be worked from the outside towards the centre of the road. Where there was excessive gravitation, such as in hilly country, provision should be made to drain the water off the road by making small drains, about 1 chain apart, towards the water table. Where a watercourse crossed the road, the speaker was of the opinion that a culvert would be more serviceable than a spoon drain. After a metal road had been constructed, no great length of time elapsed before it required attention. Small holes soon made an appearance, and in a very short time these increased in size. Where a district council had control of considerable lengths of metal road, Mr. Fleet thought that a considerable sum of money could be saved if a competent man were employed in the constant patrolling of the road, to repair small holes wherever they occurred. To make a thoroughly satisfactory job of repairing a road, the road should be broken to allow the new metal to bind with the older. The metal used for such holes should be of such a grade that it would fit into the worn-out places without causing any unevenness. Maintenance metal should be of a grade no larger than that used for the crown of the road. Road construction and maintenance work should always be carried out when damp weather conditions prevailed. In those parts of the State where the soil was of a very sandy character, it was the usual practice to scoop out the sand until the firmer subsoil was reached, and that usually made a good road. The speaker concluded with the opinion that for the proper maintenance of roads it was essential that a competent supervisor should be employed, and that the Width of Tires Act should be strictly enforced.

TARLEE.

August 14th.—Present: 18 members and eight visitors.

TRACTOR *v.* HORSES.—Mr. G. M. Cornish read the following paper:—"Very little progress has been made until quite recent years in the use of tractors on the farm, but the tractor has come into such prominence during the last four or five years that farmers are beginning to ask, 'Is the tractor better than horse power?' Under the spell of highly colored tractor reports, with larger acreage and favorable running expenses, the merits of the horse are apt to be forgotten, especially as one thinks of the novelty it would be to have a tractor obediently pulling the machines. Farmers have had enough experience with the horse to know just what can be expected of it, but we have not had the same experience with tractors. To buy a tractor and think to use it without any trouble is to make a mistake. Reports have been received of the successes of tractors in other places, but do we remember that in South Australia we can produce horses and horsefeed more

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cheaply than anywhere else in the world, whilst a tractor costs more than anywhere else, and is correspondingly dearer to operate. Comparisons with America give a false impression, for there the machine costs at least 50 per cent. less, with running costs likewise cheaper. There are several advantages, however, irrespective of cost, to which the tractor can lay claim, the foremost being that in a rush period, with everything running well, the tractor works without getting tired. Long and continuous hours may be spent in rushing a job through. There is also an advantage in the tractor being suitable for various kinds of work. It does not need a wide gate to enable it to go from place to place; it can be quickly moved to another paddock without shifting a lot of gear, and can work an implement close to the fence without loss of time. This question can only be answered when local circumstances, and the ability of the purchaser to adopt the best methods in handling the machine, are considered. If a tractor will work where horses will work, then it is so much more to the credit of the tractor. Horses have been very suitable for farm work, and will continue to be so for a very long time. Tractor power cannot be developed in a small, light running machine. It must be one of fair size and weight. Horse power, per unit, can be increased by breeding better farm horses, by weeding out the unsuitable and weak animals, and gradually building up a team that will be better in every way, and a credit to the owner. I do not think the tractor will be a success in the rough, out-back country. Wear and tear would be too big an item. It is an absolute certainty that it is useless to overload a tractor. Though we say a tractor does not get tired, it is nevertheless very sensitive to overwork. Of course, horses take a great deal of attention; feeding, watering, grooming, and harnessing, which all means valuable time, but what tractor can be run without attention? It is essential that much time and care be given to the machine. It will not stand up to continuous work without it is regularly taken to pieces, overhauled, and properly cleaned., Again, one big advantage with horses is that they can be driven from the seat of the implement, and both horses and implement are under control of one man. The tractor requires two men in all cases, except harrowing. Where only one is employed to manage the tractor and other machines, it means that the plough, the cultivator, and the combine are left to take care of themselves. That means slumming the work, and that is no good. The only remedy is to work the implements from the tractor. The next question, 'Will it pay to invest in tractors?' The average farmer is not in a position to pay £500 to see if a tractor will be a success, for the machines have not yet proved themselves to be a success under all conditions. Those who are now using tractors are paving the way to make them a success. Next, 'Is the tractor suitable under local conditions?' This is an essential point for a farmer to consider before going in for a tractor. In some districts it is undoubtedly better suited than others. Take the limestone soils of Yorke Peninsula. There it should do better on the whole than on the very sandy or black, sticky soils of this district. Next, 'Are horses more economical than the tractor?' To ascertain this it is necessary to make a year by year comparison. If the tractor is to take the place of a team of 10 horses, then it must do the whole work of 10 horses, and cover a whole year's operations. Ten horses should work an average of 250 acres each year; 250 acres fallowing, 250 acres harrowing, 250 acres cultivating—then at least one more working before seeding, 250 acres cultivating; 250 acres seeding with the combine, 250 acres harrowing, 250 acres harvesting, and carting 1,500 bags of wheat. Total acreage, 1,750 acres. To cover 1,750 acres means a lot of wear and tear on the tractor, and the fuel consumption would be considerable. Ten horses would eat, say, 50 tons of hay at £3 10s. per ton, and four weeks' grazing at 1s. 6d. per week, equals hay £175, grazing £3, total £178. There would be less wear and tear on the horses and machinery than on the tractor and machinery, and so a greater percentage would have to be written off against the tractor."

TRACTOR *v.* HORSES.—Mr. W. F. Edgerley then read the following paper:—"The horse is not yet superseded, and undoubtedly the most valuable way to work a tractor is in conjunction with a team of horses. Great strides have been made in the way of equipping tractors successfully to negotiate boggy country, and under all, except the worst, conditions tractors are well able to follow horses, but on a farm there are scores of small jobs which are more suitably done by two or three horses than by a tractor capable of pulling, say, a 15-horse load. If a tractor and horses are used in conjunction, then the tractor can do the work suitable to it, and the horses can do the smaller jobs which are more suitable to

them. The tractor can do its utmost when horses have to be heavily stable-fed, and the horses can give their maximum power output when outside feed is plentiful. The first and most important point in favor of the tractor, is that it constitutes a great reserve of power. When the necessity arrives, it is capable of being worked all day and all night, and this fact alone makes the tractor a paying proposition to a farmer. Given only a week of fine weather, and good going, the present day full-sized tractor can, if worked to its full capacity, put in, in any class of country, 300 acres of fallow, and the value of this need not be emphasised in a season such as has been experienced this year. Fallowing can be done when desired, either early, for the fallow to obtain the advantage of the winter rains, or late, so that as much feed as possible can be utilised. Harrowing and cultivating can be done in a hurry by the tractor after suitable rains, and before the ground becomes too dry and too hard, and the value of this need not be emphasised. In harvest time the tractor can be going every minute of possible reaping time; there need be no break in the middle of the day, and a maximum of speed is maintained at all times. This fact, then, cannot be too strongly emphasised—that the chief value of the tractor lies in its power to do an immense amount of work whenever special effort is desirable. The second point in favor of the tractor is that it constitutes a great labor-saving device. It is true that a tractor needs a good deal of attention if it is to be maintained in perfect order, but it is certainly not necessary to spend more than half as much time on the tractor as it is on a couple of eight-horse teams. The correctness of this can be clearly demonstrated if one considers all the work necessary to working a couple of teams. Feed for the teams has to be grown, necessitating all the labor involved in working the land and harvesting the crop. The hay has to be chaffed, and even when all this is done, to groom and feed and properly care for two eight-horse teams takes one man a considerable time. In the case of a tractor, the only labor involved in its feeding is the fetching of kerosene from the railway, and the time which must be spent every day for the maintenance of the tractor

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in good order is not a very lengthy job for any one man. Further, though in some districts a man may occasionally be seen driving 14 horses, as a general rule 10 are considered sufficient. A man driving a full-sized present day tractor is driving 16 horses, and there is no need for him either to give his machine two or three minutes spells at intervals, to take two hours off from working time in the middle of the day, or to be at the homestead by sundown. The third point is that power derived from a tractor is cheaper than power derived from horses. It is sometimes suggested that there may be, at some time, a shortage of kerosene, which would, of course, make this commodity dearer and be a serious menace to 'power farming.' With the present consumption of petrol throughout the world this is exceedingly unlikely, and we are all exceedingly hopeful of obtaining a local supply of fuel in the not very far distant future. The consumption of kerosene for farming operations depends, of course, upon the nature of the land, but most country can be ploughed at a gallon an acre, and cultivated for just over half a gallon, and with kerosene at its present price of 1s. 6d. a gallon, this is considerably cheaper than is the cost per acre with horses. Moreover, the tractor only consumes fuel whilst it is working. This is a big consideration at all times, but during a period such as the seeding just past, when both horses and tractors have been idle for several weeks, it is an immense saving. The fourth point is that the tractor is in itself a very powerful portable engine, and when this is taken into consideration, the outlay involved is very little greater than that necessitated by the purchase of two teams of horses and a stationary engine. In conclusion, tractors are only now coming into general use, but it is already amply proved that they are to play an important part in the agricultural activities of the State. Although we have just passed through one of the wettest winters on record, still the demand for tractors is greater than at any previous period. It is noticeable that in a great many cases, when a tractor is purchased, its owner, having been used to horses all his life, fails to get on with the tractor quite as well as he did with the horses, but when he has become acquainted with his machine, becomes enthusiastic as regards its abilities, and, therefore, obtains the maximum benefit from his possession."

OWEN, August 31st.—Mr. F. W. Jones, who had just returned from a trip to England, read an interesting and descriptive paper dealing with agricultural practices in England.

TWO WELLS, August 27th.—The meeting took the form of a social evening. Mr. F. C. Richards, of the Department of Agriculture, was present and delivered an address, "The Work of the Agricultural Bureau," to a gathering of 12 members and 30 visitors. Mr. Pike, Chairman of the Mallala Branch, was also present, and gave a short address. Vocal items were contributed by several of the members and visitors, after which supper was supplied by the ladies.

WATERVALE, August 20th.—An interesting discussion took place on the subject, "Fruit and Vegetable Growing." Several other topics of local interest were also brought before the meeting.

WILLIAMSTOWN, August 24th.—To a gathering of 23 members and two visitors the Superintendent of Experimental Work (Mr. W. J. Spafford) delivered an address, "Fertilisers."

YORKE PENINSULA DISTRICT.

(TO BUTE.)

KILKERRAN.

August 21st.—Present: six members and two visitors.

QUESTION BOX.—The meeting took the form of a "question box." The first question brought before the meeting was as follows:—"Is an eight-horse team, whose working order is two, three, and two, stronger than a six-horse team, yoked in a four and a two?" Members agreed that everything depended on the weight of the horses. If both teams were equal, then it was thought that there was no difference in the pulling power of each horse, because the distance from the implement did not have very much effect with such a small team. "Which is the better method of driving a 10 or 12 horse team, abreast or tandem?" It

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was agreed that the tandem was to be preferred, because unless the large abreast team worked evenly, the implements did not follow a true course, and secondly the tandem team dispensed with the heavy and cumbersome swings. "Which is the best fodder to sow for paddock feed for horses and cattle?" Mr. Dutschke favored Cape barley. Mr. R. Wakefield said lucerne could not be surpassed fo dairy cattle. Mr. B. Koch expressed a preference for Algerian oats. "At wha age should a young horse be put to work?" The majority of members though 2½ years about the right age to place the colt in work. Mr. Wakefield though the youngster could be broken in at 1½ years of age, but it should only be worked lightly and it should be given plenty of good feed. Mr. B. Koch considered that horses should not be used for heavy carting work until they were at least 5 years old.

WEAVERS.

July 23rd.—Present: 17 members and visitors.

FALLOWING.—"I consider early fallowing is necessary for the production of profitable crops of wheat," said Mr. H. Bishop, in the course of a short paper dealing with the above subject. The land should be worked to a depth of from 2in. to 2½in. and harrowed at the first favorable opportunity. The farmer should not attempt to deal with more fallow than he could harrow and cultivate at least once before hay making. For working back the fallow he thought the cultivator did a better job than the skim plough. A flock of sheep running on the fallow assisted in killing the weeds, and the land should not be worked whilst in a dry condition, unless "dog weed" was making a strong growth. In the discussion Mr. F. Anderson considered that the working of the soil was almost solely dependent on the climatic conditions that were experienced during the year. Messrs. A. and J. Sherriff were of the opinion that new land should not be harrowed, but left in a rough condition so that the action of the sun during the summer would have a sweetening effect on the soil. Mr. J. Nation said in places where deep ploughing was essential, it would be necessary subsequently to use a spiked roller to consolidate the soil.

WEAVERS.

August 20th.—Present: 16 members and five visitors.

SHEEP.—In the course of a paper under the title "Advantages to be Gained by Keeping a Better Class of Sheep," Mr. J. Bishop said there were numerous graziers who owned small flocks of sheep, and it was deplorable to see the types of ewes and rams that were used for breeding. Again, it was noticed that a farmer secured a really first class ram, but mated it with unclassed ewes. One frequently heard the remark, "Any ram will do so long as it gets the ewes in lamb." Sight was lost of the fact that judicious classing and mating would increase the quality and quantity of the clip, whereas the indiscriminate mating meant no progress and every possibility of the clip being reduced each year. By careful selection, Mr. Bishop stated, he had raised his clip from an average of 9½lbs. of wool per sheep in 1917 to 16½lbs. from ewes which had been bred from the original flock. From one flock of 30 ewes he had obtained an average return of £1 5s. 8d. per fleece. The speaker was convinced that any success that he might have gained was due to one good ram that had been mated with carefully selected ewes. No money was so advantageously expended and so quickly repaid as that used in the purchase of a high class ram. One frequent mistake on the part of small breeders was that of purchasing rams from different breeders. Uniformity of type was one of the most important essentials in a flock of sheep. Sheep with the following characteristics should be secured:—Large-bodied animals, broad on the back, wide between the legs, square, with plenty of depth, clean faces, and standing square on their legs. If the flock were kept for breeding young ewes, from which it was intended to breed again, the man who used a mongrel ram would have been able to purchase a good ram with the money that would be lost in the decreased production of the young ewe. The discussion turned to the subject whether the flock should be kept for wool or fat lamb raising. Most members were not in favor of keeping the flock for the purpose of sending lambs to market. Mr. F. A. Anderson referred to the advantages of sowing green feed for the flock and mentioned the superiority

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of Cape barley over Malting barley for green feed. Messrs. A. Cornish and J. Honner referred to the menace of the blow fly pest, and gave methods of combating the flies with the use of sheep dip and jetting.

PASKEVILLE, August 21st.—Fifteen members and one visitor were present at the August meeting of the Branch, when a paper dealing with the subject, "Dipping Sheep," was read by Mr. R. C. Cowan. An interesting discussion followed.

WESTERN DISTRICT.

ELBOW HILL (Average annual rainfall, 11in. to 12in.).

August 21st.—Present: eight members.

AFFORESTATION.—Mr. H. W. Wheeler contributed the following paper on this subject.—"In dealing with this subject, the first thing necessary is to point out some reasons why busy farmers in a comparatively dry district should devote a certain amount of their valuable time to tree planting. First of all, it was only a matter of a few years ago that any timber at all that a farmer required for building purposes, that is, either for wooden sheds, or timber for iron buildings, or iron roofs could be found in almost unlimited quantities amongst the pine patches that grew on most of the farms in this district, whereas at the present time it would be a hard matter to buy enough pine posts to make a fowl house. The timber has been removed to bring the land under cultivation, and in many instances in my own experience I have seen hundreds of beautiful pine posts and rails burnt to get them out of the way, and naturally in those early days of settlement when the timber was the biggest difficulty the settlers had to remove no thought was given to the planting of fresh trees in convenient places as a standby in future times, either for windbreaks, shelter for stock, or for the timber as a commercial proposition. Some experts tell us that where the rainfall average is inclined to be light, by removing the natural timber growth, it becomes lighter and more irregular. This seems to my mind quite a feasible argument, because moisture attracts moisture, and there is certainly more likelihood of green timber having a beneficial influence on the rainfall, than would be the case where the country has been reduced to a state of bare plains. Then again there is the appearance of the home surroundings. To my mind nothing looks better nor stands as a better monument of taste and forethought on the part of the original owner of a farm than a patch or belt of the original timber that has been preserved and cared for to provide shelter from the weather, and with the idea in view of perpetuating a sample of the natural scenery in its virgin state. Where this has been done in the older districts of our State, and even in the older parts of this district, we find that the mallee we so much despise, or the natural gum, pine, or even sandalwood trees that grew where nature planted them and where the owners of the land have gone to a little trouble to protect them, will always hold their own for appearance with the best ornamental trees we can plant. However, the trouble in that instance with most of us is that we are not original selectors of our land, and we have had no choice as to what part of the farm shall be left as a timber reserve. The land has been cleared by those who went before us, the hardy pioneers, and I guess many of us are thankful for that fact. But, all the same, I believe that if we are to make the country and country life more pleasant and attractive, one of the most important matters we must get busy about is re-afforestation. It is pleasing indeed to notice the splendid lead the Department of Agriculture is giving us in this respect—I mean the thoroughly practical way they are testing various kinds of both commercial and ornamental trees on the experimental farms in various parts of the State. After visiting our own local Government Experimental Farm at Minnipa, I strongly advise every practical farmer in this and any other district of Eyre Peninsula to go at first opportunity and see for himself the splendid results that are being achieved from the efforts of our departmental officers, particularly in respect to tree planting. The oak trees that form a windbreak to the orchard are an eye-opener, and also the olive plantations, to say nothing of the different fruits that are doing splendidly. It we are going to take this matter to heart, and set about some system of planting that is going to reward us with

any degree of success, then it is no use selecting the best of trees irrespective of whether they are suitable to our class of country, and planting them in a haphazard fashion, that is merely wasting time and expense. To my mind, the planting of ornamental trees is more than a mere hobby, it is a necessity. Our natural timber, as I have already pointed out, is fast disappearing and we must plant something in its place. I do not consider it a wise plan for a farmer to spend too much energy trying to grow fruit. A few trees around the house are quite all right, but for anything like an extensive system of planting, the first point to consider is the laying out of a scheme that can be commenced in a small way, and added to each year, with each kind of tree in its own allotted place, so that when the trees have got a few years growth on, the whole scheme or surroundings will present a neat and well-laid-out appearance. Secondly, what kind of tree to plant. The trees that seem to show up best in this district are the sugar gum and the South Australian blue gum. I commenced a small scheme of planting last year, but unfortunately it was such a severe drought that out of about 30 trees only four survived. Only one tree survived the whole year without being watered; that was a blue gum. Two white flowering shea-oaks received water occasionally and did well. This year I have planted several kinds of trees, including sugar gum, blue gum, Aleppo pine, New South Wales swamp oak, and fig trees. Most of them are doing well, but the sparrows are playing havoc with the young oaks, of which I planted two rows for a wind-break on one side of the house. My reason for setting down the different kinds of trees I am experimenting with is that I hope at some future date to report to this Branch as to how each kind of tree is progressing, and I also sincerely hope that the other members will follow on a similar line. I am a novice at botany, and practically only a beginner on my present holding, but I have thought for years that something should be done by our public bodies to beautify in some measure the empty spaces on our reserves, and in many places there is ample space on our 3-chain roads for small plantations which could be so planted and fenced off that no obstruction need be caused to the traffic, and a little effort in this direction expended from time to time would be time well spent. Our public schools are doing a splendid work in this direction, and I am sorry I have not time at present to offer more suggestions for educating our rising generation in this important matter.'' During the discussion which followed, Mr. J. A. Williams thought it was a difficult matter to determine the best kind of tree to plant. He thought it would be a good plan to plant trees as a breakwind. Mr. M. A. Wildman advised members to plant olive trees. Mr. W. T. Cooper said a plantation of trees would help to beautify the homestead; he thought planting olives was a good suggestion. He would also devote a small plantation to various trees for the benefit of future generations. Mr. T. Wildman agreed with the views of the writer and said that trees acted as a good break-wind; they would also assist in preventing drift.

GREEN PATCH (Average annual rainfall, 26.56in.).

August 20th.—Present: eight members.

SUITABLE WHEATS FOR THE DISTRICT.—The meeting was held at Mr. R. L. C. Sinclair's homestead, when an interesting discussion took place on this subject, in the course of which it was thought Queen Fan was a suitable wheat for the rich soils of the district. Mr. C. Dorward considered Federation to be the best wheat for the poorer types of soil. Mr. F. Parker considered Late Gluyas to be the best wheat for the wet portions of the district. Mr. C. Whillas thought the district too wet for the successful growing of wheat. He advised members to top dress grass lands with about 1cwt. of super to increase the stock carrying capacity of the land. The Hon. Secretary (Mr. R. Sinclair) reported that he had applied super to some of his pasture lands and that he was very pleased with the results.

O'LOUGHLIN.

August 22nd.—Present: six members.

MIXED FARMING.—A short paper dealing with this subject was read by Mr. E. A. Hasting, in the course of which it was stated that mixed farming was an aspect of agriculture that had been neglected in that district. When the district was first

thrown open for settlement, there was no incentive for the farmer to carry such profitable side lines as pigs, poultry, and cows, but now that the locality was served by a regular steamer service, with a deep sea port at Cape Thevenard, a railway running through the district, and a good number of men employed in the vicinity, many of the side lines raised on the farm could be consumed in the district. Sheep were, without a doubt, the most profitable side lines on the farm providing the farmer had sufficient land cleared to enable him to crop and fallow and still have a fair area available for grazing. An interesting discussion followed, in which the majority of members thought pigs would prove the best side line for that district, because most of the settlers were not in a position to erect sheep-proof fences.

LAKE WANGARY.

August 25th.—Present: seven members.

CARE OF THE RAM.—Mr. P. Houston, who read a paper dealing with this subject, said farmers and graziers often paid good prices for rams bred by reputable breeders with the object of improving the wool production of their flocks. The rams were usually brought into their new district "in the wool," and when shorn gave a satisfactory cut of wool. At the following shearing the opinion of the farmer regarding his purchase might have considerably altered, and the ram might possibly not yield such a good fleece. The owner would then perhaps feel that rams from such a breeder were not suitable, and he would then procure his next draft of rams from another stud master, and so that practice might continue for a number of years. The usual practice of the farmer after he had taken delivery of the rams was to shear them, with the result that with from 13 to 14 months' growth of wool they cut a fleece weighing 20lbs. and over. The rams were then turned out on good spring feed, and appeared to do very well until required for the ewes. About December or January, they were mated with the ewes and kept with the flock for about eight weeks. At the end of that term, owing to the great demand that had been placed on their system, they were naturally in a very low condition. In such a state, they were then turned into a bare paddock. Hardly a thought was given to them until the next shearing season arrived, and the farmer was disappointed that the cut from the rams did not equal last year's return. It was quite probable that one of the rams of the draft would give a better fleece than another, and the farmer would immediately think that it was the better ram, but the fact that such a ram had probably been the poorest sire of the flock was overlooked. When the rams were separated from the ewes they should be placed in a small paddock that had previously been sown with some fodder such as kale, lucerne, or rape, and that, with access to a good salt lick and a supplementary ration of 1½lbs. of oats per day, would assist the rams in building up their original bloom. The extra wool that would be obtained was well worth the trouble of special care and attention, to say nothing of the vitality that would have been added to the rams for the next season.

RABBIT DESTRUCTION.—Mr. J. A. Shepperd, who contributed a paper dealing with this subject, said whilst the rabbit was perhaps one of the greatest pests against which the farmer had to contend, there were many ways of keeping it under control. It was to be regretted that some landholders made no efforts to keep the rabbits under control, but allowed their farms to resemble a breeding ground for vermin. In places where is was possible, the burrows should be dug out, but in stony places, where that plan could not be adopted, traps could be used. A couple of good running dogs, and one to hunt the rabbits from their hiding places would also account for a large number of rabbits. A good price could be obtained for the skins if they were properly pegged out. When the skin had been removed from the rabbit it should be placed on a bow made from a coarse piece of wire about 3ft. in length. Both ends of the bow should be made as square as possible. The skins should be hung up in the shade to dry, and painted with sheep dip or a prepared skin preserving compound. When removed from the bows, the skins should be placed between two pieces of deal and bound tightly together, so that they would be kept in shape and not lose weight.

ROBERTS AND VERRAN.

August 21st.—Present: nine members.

FARMING MALLEE LAND.—The following paper was read by the Hon. Secretary (Mr. B. Evans):—"To secure the best returns from mallee land, it is necessary to clear the land of shoots and stumps as soon as possible. For this reason every effort should be made to have a succession of stubble fires over the land, because burning is undoubtedly the quickest method of killing shoots. Scrub should be rolled early, and be ready to burn on the first good day in February. I have found that if the scrub is rolled about 18 months before it is burnt a greater number of stumps are killed, but when this method is adopted the scrub does not burn up so cleanly. For working new land, I prefer a medium weight share plough, but if there is a large area to put in, a cultivator could be used. About 1½in. is sufficient depth to plough the first year. About the end of April or early in May is the best time to drill wheat on virgin land, because the earlier it is put in the better, and as there are no weeds to trouble the first crop, it can be put in dry if necessary. The second crop can also be wheat. The stubble land should be ploughed as soon as possible after the stubble is burnt, and cultivated ahead of the drill, if possible after a rain. The third crop should be oats, an early maturing variety for preference being sown. By this time the shoots should be fairly well under control, and the land could be left out a year for grazing, and then fallowed. If the shoots are to be thick, they should be cut and burnt during the summer prior to fallowing, because a good seedbed cannot be prepared in very bushy land. For fallowing I prefer a fairly heavy plough with a strong team, so as to pull out as many stumps as possible. This work should be commenced in July, and if possible the stumps should be picked up in time to work the fallow with the cultivator and harrows in the spring. Two inches is sufficient depth for the first fallowing, but as the land is cleared of stumps this could be increased to 3in. In working the fallow, care should be taken not to work the cultivator in too deeply, because the aim should be to pack the lower layers of soil, leaving the immediate surface in a loose condition. By this time it should be possible to work the land on the four-course rotation, fallow, wheat, oats, and grazing. If this system of cropping is carried out, there should be little fear of take-all, which takes a heavy toll of wheat crops in the mallee country every year. Late varieties of wheat are not suitable for this district, the best returns usually being secured from early varieties, but mid-season wheats could be used for early sowing. For new land, I think, 45lbs. of seed is sufficient, but on land that has been under cultivation better returns would be gained by sowing about a bushel per acre, with 1cwt. of super. When growing oats for grain 1bush. of seed per acre would probably give a maximum yield, but for hay crops, the seed should be increased to 60lbs. This would not only increase the yield, but would result in a finer straw. As soon as there are sufficient paddocks available, the holding should be stocked with sheep, which are not only a valuable source of income, but do a great amount of good in checking the growth of weeds and bushes, as well as improving the fertility of the soil. I prefer Merinos for this district, but with a market for fat lambs, a quicker maturing and larger framed sheep could be bred from Merino ewes by a Dorset-Horn ram. Ample provision should be made for conserving water, and a good supply of fodder should be kept on hand." In the discussion which followed, Mr. G. Smith said he did not favor deep ploughing, because the land did not "pack" properly to make a good seedbed, and very often caused take-all to appear in the crop. Mr. H. Simmons favored light ploughings for the first two years, but prefered ploughing about 3in. when fallowing, so as to pull the stumps out as soon as possible. Mr. F. Masters wished to know of a good early variety of oats. Deep ploughing was not a payable proposition in mallee country. He thought the land could be worked more often to advantage. Mr. M. Masters agreed that the sooner the rotation system was introduced the better. He thought 3in. was sufficiently deep to plough until the land was well cleared and set down, but he thought it could then be gradually worked to a greater depth. The land should be heavily dressed with super, the heavier the better. In reply to Mr. F. Masters, the writer mentioned "Ruakura" as a quick-growing variety of oats. He did not favor deep ploughing in bushy land.

SMOKY BAY (Average annual rainfall, 13.06in.).
June 23rd.—Present: 10 members.

FALLOWING.—Mr. E. D. Lovelock, who read a paper dealing with this subject, said one of the first points that required attention before fallowing commenced was to see that all stumps projecting above the surface of the ground were levelled off, because it was possible for a small stump that was not level with the ground to lift the plough out of the land. After seeding was completed, a narrow strip of oats should be sown, just outside the fence, to assist in preventing the sand from drifting on to the fence. Prior to the commencement of fallowing, the plough should be overhauled and the shares sharpened. If sheep were kept on the holding—and the speaker considered them a most necessary factor in the successful working of the land—they should be grazed on the land some little time before the plough was brought into use. If possible, fallowing should be commenced during the latter part of June or early in July, because early fallow had a tendency to prevent the development of the take-all fungus. For that district he thought that the land should not be worked at a greater depth than from 2in. to 2½in. A few weeks after the fallowing had been finished the land should be worked with a light scarifier to leave the land in a rough condition, and so minimise the danger of drift. Should weeds make their appearance on the fallow, the sheep could be relied upon to keep them in check. Any hollow patches of land that were especially subject to drift should be covered with stable manure and straw, which would assist in retaining the soil when it was blown over the holes.

YALLUNDA FLAT (Average annual rainfall, 18in. to 19in.).
August 18th.—Present: 10 members.

FODDER CROPS.—The following paper was read by Mr. W. R. Richardson:—"In writing on this subject it is not only the object of providing feed for our stock that I have in view, but also the general improvement of the land. For a number of years I have been of the opinion that to get the most payable returns from the farms in this district, we must go in for mixed farming and increase the stock-carrying capacity of the land to the maximum instead of simply depending on cereal crops. In most cases the soils are light and deficient in humus, and continual cropping with cereals tends to exhaust the humus, and naturally the crops suffer. One way of returning humus to the soil is by crowding stock on small areas, and to do this we must grow fodder crops, which can be grazed by the stock. The main object of growing fodders, however, is to provide feed for the stock when the natural herbage is poor or through the summer months, when there is a scarcity of feed. As a general rule, we have a long, wet winter, and too frequently one sees unthrifty and poor, undersized weaners trying to eke out a living when the feed is short and making no growth. One also notices miserable lambs with their mothers in such poor condition that they are unable to give them proper sustenance. This could be avoided by putting in a week's work at the end of March with the drill and cultivator, to provide sufficient feed to enable the ewes to rear a good, lusty lamb. We must remember that fodder crops, or catch crops as they are sometimes called, are more or less a gamble, and if we fail one year there is no need to be discouraged. For instance, rape may be sown early in the autumn in anticipation of the season breaking early, but the rain holds off until late and the weather sets in cold and the rape makes poor growth. Or we may sow a crop for summer fodder and get an exceptionally dry summer, and a failure of the crops. But it must be remembered that these are exceptional years, and not the general rule. To provide feed for winter, I recommend sowing a mixture of rape, oats, and white mustard. The latter is a very quick grower. If you have a small paddock, fallow it and work it down well in the spring, and then drill it towards the end of March or early April. Rape is best sown when the ground is moist enough to start germination, but if it does not lie too long, germination will not suffer. Sow about 1½bush. of oats, 3lbs. of rape, and 1lb. of mustard per acre with about ½cwt. of super. If this crop makes an early start, it will insure an abundance of good feed early in the winter. Another good method of providing winter feed is to burn off a stubble paddock in March, and immediately run the cultivator over it, and drill in oats or barley. We had a very good growth this year on about 70 acres of stubble, and it was a very

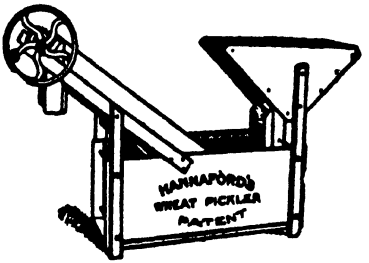
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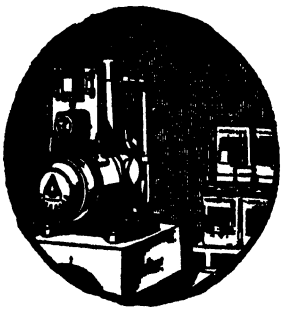


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interesting experiment. On different parts of the paddock we put Scotch Grey oats, Cape oats and barley mixed with rape, a little Subterranean clover and Wimmera rye grass. It was too late for the rape, which, however, did well in patches. The grasses, of course, were for future pasture. The Scotch Grey oats yielded the best early feed, and when we put the sheep on the paddock towards the middle of July, the crop in places was a foot high. If oats are sown on the stubble without rape they can be fed down until reaping, and often yield a fair crop. Rape is a wonderful fattening fodder, and provides a great bulk of feed. It has a large tap root, which goes straight down and opens up the lower layers of soil. Care must be taken to accustom the stock gradually to rape, because it will cause them to blow if they are given too much at the first feed. For this crop the ground should be worked to a fine tilth and the seed sown to a very shallow depth. These are the winter fodders which we have proved to be the most successful, and even a small area will often save a lot of worry in the winter, when feed is scarce. Peas, although sown in May or June, are not fed until spring or summer, and our experience has been that they are the most valuable crop for providing summer feed, because there is not so much risk of failure as a spring sown crop. For some years we tried peas as a fallow crop, but without very much success. For one thing, it is generally too late before they are sown, and secondly, one is not able to work the fallow. A better practice is to fallow after peas. To obtain the best results peas should be sown on fallow, during May, with 80lbs. to 100lbs. of super., and 1½bush. to 2bush. of seed per acre. It has been recommended to sow 1bush. of oats and 1bush. of peas. This mixture having the reputation of being an excellent crop for fattening stock. Peas can be fed any time from November until April. They do not seem to deteriorate through being allowed to lie on the ground, and we have left them until April and put the ewes to lamb in the paddock. On a small paddock of 10 acres of peas we kept 180 weaners for six weeks. Peas is a costly crop to put in, because the seed usually costs from 8s. to 10s. per bushel, but when the results are considered, it is cheap at the price. Up to 15 sheep per acre can be fattened on a good crop of peas. Of the spring sown crops, the only ones we have grown successfully are sorghum and Sudan grass. A review of the rainfall records for the last few years will be interesting to see what summer rain falls, because it is on these that the success of the crop depends. The rainfall from October to March since 1914 is as follows:—

	1914-15.	15-16.	16-17.	17-18.	18-19.	19-20.	20-21.	21-22.	22-23.
Oct.	63	74	178	238	235	132	185	116	—
Nov.	139	22	216	94	7	12	183	253	—
Dec.	145	—	33	79	133	57	89	63	—
Jan.	37	13	83	28	70	10	120	139	59
Feb.	12	—	165	6	139	—	33	11	15
March	31	35	143	25	5	35	83	20	—

Of these nine years, 1915-16, 1919, and 1922 are the only years when conditions was so dry as to make summer crops likely to fail. In the other six years there were good rains at intervals throughout the summer. I consider we can, with advantage, make use of the fallow for sowing sorghum or Sudan grass. The crops are not sown until the end of September or early in October, which gives the chance of thoroughly working the land and killing all rubbish. Sorghum makes an excellent fodder and grows a large quantity of feed. It also grows rapidly after being fed down. In 1920 we sowed a paddock with 10 acres of sorghum, two of maize, and one of turnips. The last named were a failure, and germinated very badly. Plants which did come up were taken by the grubs. The maize did well, until the hot winds started, and grew to 18in. or 2ft. high and then stopped. The sorghum did remarkably well and grew to 5ft. and 6ft. high in places, and after feeding off grew again rapidly. The following are the particulars of treatment:—The land was ploughed at the end of August, worked up with a spring tyne cultivator, and drilled on September 21st with 8lbs. of sorghum and 80lbs. of super. per acre. The rainfall was not particularly good that year, which goes to show that good results can be obtained on moderate rainfall. On December 28th we put 290 sheep in this paddock of 14 acres in all, and removed them on January 13th—17 days' grazing. On March 1st 250 sheep were grazed in the paddock, and on March 15th they were taken out—14 days' grazing. On

May 4th we put in 80 ewes and lambs—nine days' grazing. On May 5th we put in 78 ewes and lambs after eight days' grazing. On May 13th 158 were removed, and on May 16th the same number were put back in the paddock. They also had the run of another small paddock of about 30 acres. The sheep were finally moved on May 26th. The grazing of this paddock works out at approximately 11,054 sheep for one day on the 10 acres or sorghum, or an average of three sheep per acre for the year, and when we consider that the whole cost of putting in the crop works out at about 21s. per acre, it was a very profitable crop. The following year we sowed about 20 acres, but germination was very poor. We have only grown Sudan grass once, and that was last summer. It was not put in well, but the results convinced us that it is a most hardy and valuable fodder, and would, under favorable conditions, do well here. This crop was put in in the same paddock as the sorghum just mentioned. It was ploughed on September 28th and 29th, after 60 points of yain, and as the ground was hard it was not a good job. It was harrowed and drilled on October 3rd, and then harrowed. There was practically no germination until after the rains in December, and then it came up thinly. In spite of the very dry summer we were able to keep four or five cows on it for three months, besides feeding it down a couple of times with sheep, and it kept growing all the while. In concluding, gentlemen, I would remind you that it is important to have the ground thoroughly worked to a good tilth for spring sown crops, and to plough the ground intended for sowing as early as possible after seeding is finished. I would urge all to go in more for growing fodders and finding out the most suitable, because I am sure you will find the benefit of them, both in improving the land and stock, and you will also be prepared when the freezing works start, and will be able to be of great assistance in making them a success."

BIG SWAMP, August 23rd.—The Hon. Secretary (Mr. J. W. Winch) read extracts from the *Departmental Bulletin* "Feeding Tests with Pigs," and an interesting discussion followed. For bacon for home use, Mr. Simes favored an animal weighing about 160lbs., but for curers and marketing purposes the majority of members favored a much lighter animal.

COLLIE, August 25th.—An address, "Past Experiences in Farming," was delivered by Mr. J. W. Lynch to a gathering of 14 members and five visitors. An excellent exhibit of turnips was tabled by Mr. J. Dolphin.

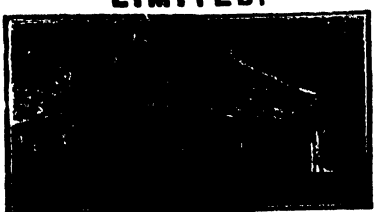
YADNARIE, August 21st.—Mr. O. Forbes read an article from the *Journal of Agriculture*, "Stimulating Interest in the Work of the Agricultural Bureau," and a keen discussion followed. The Hon. Secretary (Mr. A. Jericho) referred to the very good results that had followed the introduction of experimental plots con-

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ducted under the auspices of the Butler Branch of the Agricultural Bureau. Mr. J. J. Deer said if the Bureau was discontinued farmers would perhaps realise more fully the benefits that they had received from the organisation in the past. Several other members spoke, and all urged members to maintain a live interest in the work of the Branch.

YEELANNA, August 18th.—Mr. F. Proctor read a paper, "Agricultural Education on Eyre Peninsula," in the course of which he eulogised the work that was being done by the Agricultural Bureau. He also expressed the opinion that each Branch on the Peninsula should receive more visits from the departmental experts, and thought that a school for farmers held at the Minnipa Experimental Farm, and conducted on the same lines as the Winter School for Farmers at Roseworthy Agricultural College, would be well patronised by members of the Bureau on Eyre Peninsula.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

CLAYPAN BORE (Average annual rainfall, 16in. to 17in.).
August 27th.—Present: eight members.

FARM BUILDINGS.—In the course of a paper dealing with this subject, Mr. W. B. Andrews believed it was a better plan to erect a large shed and divide it into small partitions rather than to have a number of separate small sheds placed in different parts of the homestead block. The partitions could be made with rails, whilst the outsides could be formed with wire and broom bush. With a gable roof on the large shed, the amount of timber and iron required would be reduced to a minimum. The post for the stables should be 4in. x 4in., but the remainder of the timber could be 3in. x 2in. jarrah, with 4in. x 1½in. rafters bolted to the tops of the posts, with 3in. x 2in. purlins to carry the iron. Screw-pointed nails should not be used for the iron, because they made a dent in the material before they went through the iron. The farmer who was not an experienced builder should first erect one side of the gable, and the other could then be added. A pitch of 2in. to the foot should be made on the roof, and then finished with a 10in. ridge capping. If gutters were to be used they should be placed in position before the other work was taken in hand. The holes should be bored in the tops of the posts before the latter were placed in position. When the posts were fixed, one nail should be placed in the rafter against the hole in the top of the post, and a hole bored through the rafter. When commencing to build, a start should always be made from the top of the post. If the shed wall was 8ft. from the ground level, all the posts should be marked 6ft. from the top. Next, two posts should be placed in position and levelled to about 8ft. apart, and if a piece of board was nailed on to the 6ft. mark on the posts, then the tops of the two posts should be level. Next, a piece of board should be fastened to the 6ft. mark on the posts at the other end of the shed, and by sighting over the three pieces of board the shed should be level from end to end. The same plan could be carried out with all the other posts. For the horse yard he favored a post and rail structure. The large shed should be situated south-east or north-east from the dwelling-house, because the wind did not blow for any length of time from those directions.

MARAMA.

August 27th.—Present: 14 members.

FALLOWING.—The following paper was contributed by Mr. E. C. Tilley:—"I consider a farmer, either on plain land or in the mallee areas, should take the first step towards fallowing during the summer months, by seeing that a good burn is obtained on the land he intends to fallow. Fire is very essential to the land, and especially in the mallee areas, it improves the wheat-growing qualities of the land, checks the growth of mallee shoots, and clears all rubbish off the land, thereby enabling the plough to make a better job of the fallowing. To obtain the best results, the land should be fallowed as early as possible after

seeding, thus enabling the soil to absorb all the available moisture during the spring and summer months. I think a farmer could afford to give his team a short spell after the seeding is finished, it will freshen them up, and give them a better heart to go on with the work of fallowing. While the team is enjoying a rest, they should be stabled and well fed and not turned out, as is too often the case. The farmer should thoroughly overhaul the plough, and see that it is in good order. See that each body of the plough is straight and well set, put in new bolts where they are required, and pay special attention to the shares. I favor the share plough for fallowing. The disc has a tendency to run over the roots, but the share breaks a good percentage, and where the mallee is growing this in itself is a big consideration towards terminating the life of the mallee, and also retaining the moisture in the land. The swings and chains also require attention, for by giving this one may avoid breakages and loss of time during fallowing. Under local conditions, I think a team of eight horses on a six-furrow fallowing plough is about the required thing, because they will work it comfortably and at a fair depth. The depth, of course, depends on the class of land fallowed. In this district, where clay is close to the surface, as is the case in some of the flats, it is a mistake to fallow deeply—a depth of 2in. is sufficient, but on the sandy soils about 3in. is required. Where we have undulating country to work, it is a good plan to mark the work out in lands according to the sandridges, and always throw the furrow downhill and finish the lands as near the crown of the ridge as possible, and at the completion plough the corners out. Now, when the first stage of fallowing is completed, the harrows should then come into operation. Work a good set of six-leaf heavy harrows and put eight horses on them, and cross harrow the ploughing. In mallee land, where stumps plough out freely, the harrows will bring roots to the surface, making it easier to handle them. After the harrowing is finished the stumps should be removed before any further working of the land, and where a farmer is within carting distance of a railway siding the stumps are well worth stacking room on the land, and have been the means of a living for many a mallee settler. With the stumps cleared, the cultivator or skim plough can be brought into action. I find from experience that a spring draught cultivating plough is a very good implement for working back the land. In a new district, where farmers are not sufficiently advanced to have sheep to keep the fallow clean, more labor is required to work the land. In working the fallow back, advantage can often be taken of suitable weather for killing the rubbish. After the ploughing back, and another good cross harrowing, the fallow should nearly be ready and not require much working at next seeding time. By fallowing one can use larger implements at seed time, and a greater area can be put under crop. Under local conditions, where sandy soils are liable to drift during the summer months, it is a mistake to fallow close to fences, because often a line of fence becomes partly submerged with drift. This can be avoided by leaving a strip not fallowed, say one chain in width, from the fence. This will be a great help towards keeping the fence free from drift, and at next ploughing season these strips can be broken up and worked in with the fallow when seeding. It should be every farmers' ambition to fallow as much as possible, especially in the new mallee districts, because during lean seasons it accounts for the difference between "crop failures" and "profitable returns." In conclusion, keep in mind the following points:—Feed the team well, and fallow as early as possible, keep the implements in good order, and work according to the weather and the weeds. Good fallow is the secret of success."

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).
August 26th.—Present: 18 members and two visitors.

WHEAT CULTURE.—A short paper dealing with this subject was read by Mr. G. Kutchel, in the course of which it was stated that the first essential for the production of good crops of wheat was the preparation of early fallow. For that district he thought that land should be worked to a depth of about 3½in. to 4in. The fallow should be brought to a good compact seedbed with the aid of the harrows, and then worked with the spring-toothed cultivator. He did not think it advisable to start seeding immediately after rain had fallen; it was better to allow at least 10 days to elapse, so that the weeds would have had a chance to

germinate. The farmer should endeavor to procure good, clean seed, and to reduce the risk of smut to a minimum all seed should be pickled. He thought that the best method of pickling was that of turning the grain backwards and forwards on the ground with a shovel. It was a good plan to pickle the seed some little time ahead of sowing, so that the seed would be dry before it was placed in the drill. The farmer should realise that as a general principle a small area of well-worked land would give better returns than a large tract of land put in carelessly. An interesting discussion followed, in which members expressed themselves in favor of various methods of pickling seed prior to seeding.

BERRI, August 20th.—Mr. F. Murray Jones, B.V.Sc., M.R.C.V.S. (Deputy Government Veterinary Surgeon) attended the meeting and delivered an address.

BLOCK E, August 21st.—Mr. W. E. Muspratt (Irrigation Instructor and Inspector) attended the meeting, and delivered an address, "Planting the Block, with Special Reference to the Conditions under which Settlers in the Chaffey Area will be Working." Mr. G. Kubank reported the following results of the Annual Ploughing Match held on August 17th:—Mr. W. B. Carr 1st, 19 points; Messrs. Kubank and Pethick equal for second place, with 17 points each; and Mr. E. W. Williams 3rd, with 15 points. The work was judged by Messrs. L. Pitt and A. Flaherty, who congratulated the competitors on the fine work that had been accomplished.

COOMANDOOK, July 25th.—Mr. E. Leishmann (Orchard Instructor and Inspector) attended the annual meeting of the Branch and delivered an address, "The Principles of Pruning." On the following day Mr. Leishmann gave a pruning demonstration in Mr. Chapman's orchard.

HALIDON, June 27th.—An interesting and instructive paper, "Soils," was contributed by Mr. F. Gascoigne, and a keen discussion followed. A further meeting of the Branch was held on July 25th, when Captain S. A. White, C.M.B.O.U. (Vice-Chairman of the Advisory Board of Agriculture), attended the meeting and delivered an address, illustrated with lantern views, "The Economic Importance of Bird Life," to a gathering of 100 people.

MOOROOK, August 24th.—Mr. A. G. Carne read an instructive paper, "The Soil," from notes that had been prepared from lectures given at the Roseworthy Agricultural College Winter School for Farmers. An excellent discussion followed the reading of the paper.

MURRAY BRIDGE, August 14th.—The meeting took the form of a "Question Box," when several subjects dealing with items of local interest were brought before the meeting for discussion. The Hon. Secretary (Mr. A. R. Hilton) presented the annual report, and the officers were elected for the forthcoming year.

NETHERTON, August 24th.—Mr. R. Cattle read an interesting paper, "Shortage of Feed for Live Stock During the Winter Months," and a keen discussion followed.

PARILLA, August 24th.—Mr. A. W. Wilden read an article "Wheat Land Investment: Large Farms *v.* Small," and an interesting discussion followed, members generally favoring the small farm.

WILKAWATT, August 25th.—The Hon. Secretary (Mr. F. R. Koch) read an article, "Top Dressing of Pastures," and an interesting discussion followed. Members were convinced of the benefits to be derived from the application of manures to grass lands. One member firmly supported the practice of heavy dressing of superphosphate for cereal crops in order that better feed would be obtained for grazing. If the stock carrying capacity of the land was to be increased, forage crops would have to be sown on lands that at present were left for pasture.

WINKIE, August 20th.—The Deputy Horticultural Instructor and Manager of the Berri Orchard (Mr. C. G. Savage) attended the meeting and delivered an address, "Spraying Trees and Vines."

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SOUTH AND HILLS DISTRICT.

IRONBANK (Annual average rainfall, 33in. to 34in.).

August 25th.—Present: four members and two visitors.

RABBIT DESTRUCTION.—Mr. I. Morgan, who read a short paper dealing with this subject, said the rabbit was a pest to be feared by all landowners, and he believed the use of the ferret to be the most profitable method of keeping it under control. He had used ferrets for three afternoons and had taken nearly 60 rabbits, the skins of which realised 26s. Trapping was another good method of dealing with the rabbits, but the trap was expensive, and there was always the danger of the rabbit pulling the trap peg out of the ground and running off with the trap. Poison could be used successfully on farms and grazing properties, but the speaker did not think it would be very effective in their district. Mr. G. Pole mentioned that he had poisoned blackbirds by placing pieces of poisoned quinces under trees and in creeks.

KANGARILLA.

Present: 19 members.

August 10th.—Present: 19 members.

VINE PRUNING.—Mr. F. Steer, in a paper dealing with this subject, stated that prior to the commencement of pruning operations, the secateurs and saw should be sharpened so that clean cutting would result. The correct time to start was when the leaves had fallen, generally commencing on those varieties which start to shed their leaves early in the season. The best time to prune currant vines was about the end of June and the work should be continued on through July. The operator should consider the growth that had been made by each vine during the past year, and if the growth had been coarse, an extra rod should be left, but if the vine had only made poor headway fewer rods should be left. He considered the short spur and medium length rod the best, because the very long rod only grew three or four buds on the end, and having to support too much wood, it was only able to produce grapes of a poor quality. With a spur vine that had made very strong growth, it was better to leave a "thumb and finger" rather than to start another arm. The Muscat and Doradillo varieties should be pruned with very short spurs, and he favored cutting about half way between the buds for the spurs, because he did not think cutting right down to the bud a good practice. The Muscat should be summer pruned, because it produced a number of shoots from blind buds which robbed the growth from the bearing wood. All pruning should be performer with the idea of keeping the centre of the vine open, and running along the wire, so that the vine would not be injured with the plough. Stock should not be allowed in the vineyards whilst the leaves were still on the vines. In the discussion that followed it was mentioned that with early pruning the buds burst more quickly, but there was a grave danger of the young shoots being cut with the frosts, and for that reason members considered it would not be advisable to prune too early. The question arose as to whether the dead wood should be cut out each year when the vine was pruned half way between buds, which gave the bud a stronger hold on the cane. Mr. Steer explained that in the next winter pruning, that all dead wood was cut out below that bud, and a fresh bud was selected to form the top bud. Two buds were left on each spur. Some members thought that one bud was not enough for Doradillos. By summer pruning, the winter pruning was considerably helped. The number of spurs to be left on the rod and spin system was discussed. By leaving seven or eight spurs, members thought, better fruit would be obtained than by leaving 12 or more spurs.

ROOT CROPS AND THEIR VALUE.—Mr. H. B. Michelmore, of the Meadows' Branch, read a paper dealing with this subject at a meeting of the Branch held on August 20th. In the discussion that followed, one member said mangolds could be stored and kept in splendid condition for six months. Mr. Smith advised planting during the latter end of December. The ground should be well worked up to a condition equal to that required for summer potatoes and the seed sown with 2ft. between the rows. The plants needed thinning out, and the land cultivated to conserve moisture. For feeding to milking cows, the mangold was very satisfactory. It could be fed whole or cut in small pieces. Mr. S. Smith stated that maize, fed with the young cobs, was a splendid milk producer.

ROCKWOOD.

August 20th.—Present: 19 members.

CONCRETE FOR FARM BUILDINGS.—"Concrete for farm buildings and floors of cow byres, stables, and pigsties is in my opinion the best material to use," said Mr. G. Solly, in a paper under the above title. Concrete, both from an economical and durable point of view was to be preferred to any other material. The manure that was taken from the sheds sheltering the stock was of a better quality where concrete was used, because all the moisture was conserved and could be carted out with the manure. With sufficient bedding, the concrete floors could be kept in a dry condition, they were easily kept clean, and discouraged the presence of flies. The first step in making a concrete floor was to secure a solid foundation, next the floor should be graded, and all foreign matter removed. The slope on the floor should be in the proportion of ½in. to 1ft. For the pig-stye, however, he suggested sloping from the back and the front, and making a drain in the centre, thereby draining all waste out of the sty. When the concrete was placed in the sty, two bars of iron should be set in the concrete, to which the trough should be attached, so that the pigs could not capsize their feeding vessel. For making first-class concrete, clean river gravel should, if possible, be obtained. Such material would take one part of cement to six parts of gravel for an ordinary farm floor. The sand and the cement should be first thoroughly mixed in a dry state, and the water then added slowly until the proper constituency was reached. The mixing should be done on a clean floor or on boards. Where clean gravel was used, no finishing mortar would be required. The floor of the cow byres and pigsties should be made with a rough surface to prevent the animals from slipping. Concrete floors should, if possible, be laid down in the winter, because it was necessary to keep the material damp until it became thoroughly set.

ONION GROWING.—In the course of a paper dealing with this subject, Mr. F. Wills said, to grow onions successfully, the ground should be ploughed to a depth of six inches, at least one month before they were planted. The ground should then have artificial or farm yard manure applied to the surface, and then ploughed again and well worked down to a fine tilth. He had found that a good dressing of guano gave better results than higher priced manures, because it acted most readily. That was an important point, because the onion plant should be forced from the time it was planted. If it were checked, a poor crop would be the result. Half a ton per acre was a good dressing, but if the "flooding" method of watering was adopted, a heavier dressing could be made. When the ground had been worked down with the harrows, a strip should be raked with a hand rake, and as one one row was planted, another could be raked. That would keep the ground level and allow the plants to be planted at an even depth. The rows should be 10in. apart, and the plants 4in. apart in the rows. Planting carried out on those lines would take 200,000 plants to the acre, and should yield 20 tons to the acre. Too much attention could not be given to the selection of seed. If possible, the grower should always grow his own seed, which should be selected when the crop was being picked up for market. Onions selected should be of moderate size, the right shape and color. Color was an important point, especially with the Brown Spanish variety, because they had a tendency to take on a lighter color, which meant that in a few years they would lose their keeping qualities. The best keeping varieties were Brown Spanish and Brown Globe, or James Long Keeper. He favored a cross between the Brown Spanish and Globe, which gave depth to the Brown Spanish, which meant a heavier crop. To grow onion plants, the seed should be sown about the second week in June, and should be ready to plant out for the main crop the first week in October. The onions should be ready to pull about the middle of March, so the crop could be housed before the commencement of the rains, because the rain discolored the onions. The onions should be pulled when the majority of them had "gone down," six rows being placed into one with the tops facing upward to keep the onions from being burned by the sun. They should be left in that position until the necks were thoroughly dry. When picked up they should be run through the hands, all surplus skin and tops removed, and then carted into the shed when sufficiently cool. The onion shed should have plenty of ventilation, the floor being raised off the ground and made of slats placed ½in. apart. The onions should not be stacked more than 3in. high or 10in. wide.

LENSWOOD AND FOREST RANGE.

August 8th.—Average annual rainfall, 35in. to 36in.

Members visited the Government Nursery at Belair for the purposes of securing forest tree seedings for planting. A trip of inspection was also made to the Government Orchard at Blackwood, where, under the guidance of the manager (Mr. R. Fowler), members inspected the various horticultural experiments that were being conducted.

CROP DIVERSIFICATION.—At a further meeting held on August 20th, a paper on this subject was read by Mr. M. Vickers, in the course of which it was stated that growers in that locality who prided themselves on their ability to produce high-grade apples were foresaking that industry for other lines of produce. At the same time the speaker realised that such a position had been brought about largely through the failure of the apple crop and the necessity for turning attention to other means of deriving a livelihood. The main point, however, was that growers were beginning to grow produce of so diverse a nature as to interfere with the production of high-grade apples on economical lines. In this district it was not an uncommon occurrence to observe a grower neglecting, at a critical stage, thoroughly to spray his orchard, on the plea that no time was available for the work, yet at the same time time the grower was devoting his attention to some small crop, which at the best, was more or less a gamble. He believed that the retrogression of the locality, so far as its reputation as an apple growing centre was concerned, was due in a very large measure to too diversified cropping. Most of the apples grown in the district were produced and handled under the same conditions that prevailed ten years ago, whilst other apple growing centres, which now held pride of place, were considerably improved in cultural methods. Such improvements as high-powered spraying outfits, double and three furrowed ploughs, cool stores, &c., greatly facilitated the raising of crops, but whilst being necessary, they could not be owned and operated on small orchards without over capitalising the orchard, so that the obvious remedy was to enlarge the holdings. The aim of the producer should be first to hold from 20 to 30 acres of apples and prunes. Such an area would be a one man proposition, thereby allowing that personal supervision which was so necessary for combating the multitudinous pests which were a contending factor to successful horticulture. Apart from the harvesting of the fruit, one man should be able to perform all the work on a holding of the area mentioned. The system of marketing was not all that could be desired. When a grower who produced some thousands of cases of apples had to travel 20 miles to a market with a few cases and then haggle over the sale of each individual case, there was something wrong with the methods of placing the produce on the market. He, of course, realised that they must to a certain extent rely on "pot boilers," but only those lines that would act as "fillers" among the apple and prune trees should be used until such time as the main portion of the orchard came into profitable bearing. The growing of raspberries, however, might be undertaken in those places that had sheltered spots especially suited for the purpose. He was not particularly optimistic regarding the cultivation of raspberries on a very large scale in this State, especially when one realised that the growers in Tasmania had just had a bumper crop for which they were prepared to accept 2½d. per lb. The huge crop of last year in that State had left a surplus of 500 tons to raspberries to come on to a market with "the bottom already knocked out of it." On the other hand he regarded the prospects of the apple and prune crops as fair. The record crop of apples in Tasmania and Victoria, coupled with the unusually dry summer, was causing enormous quantities of fruit to fail to mature, and that would very materially lessen the quantity available for export during the next year. The paper concluded with a reference to the new variety of prune, "Coates 1418," which would soon be available for planting, and the advantages which it appeared to have over the "Prune D'Agen."

RAPID BAY.

September 1st.—Present: 29 members.

CARE OF THE FRUIT GARDEN.—To those who intended planting an orchard, Mr. S. J. Lord, in the course of a paper dealing with the above subject, suggested that the land should be ploughed and thoroughly worked during the summer months. For that district he favored early August planting. Large holes should

not be made in which to plant the trees, because if there was a clay subsoil, it held the water, which became stagnant and so injured the tree. On the other hand, if the trees did grow, the roots made a rapid growth in the soil immediately surrounding them, but then they came into contact with the clay they were too tender to penetrate it, which caused them to curl and become matted. He had had best results by making a shallow hole, spreading out the roots evenly, and then covering them with fine soil, which should be tightly packed around the roots to keep the tree firm and upright. The soil which was taken out from the bottom of the hole should then be placed on the surface of the ground. The trees should be cut back to about three branches. The trees should be also pruned every year, and the fruit encouraged to grow on the stout limbs. Peach and apple trees should be sprayed with Bordeaux Mixture during August and again when the flowers were setting, to keep curl leaf and codlin moth under control. When the trees had become established, the land should be ploughed in April and then left in a rough condition, so that the furrows would help to drain the soil. Several questions were then brought forward for discussion, the first being, "Is it advisable to milk a cow just prior to calving?" Members were divided in their opinions regarding the best practice to adopt. Some thought the plan advisable, whilst others considered that milking prior to calving would be apt to bring about milk fever. "A remedy for cores inside cows' teats?" Members suggested rubbing olive oil on the teats and udder. "The best time for dipping sheep?" The opinion was unanimously expressed that all sheep should be dipped about one month after shearing.

ASHBOURNE, August 20th.—The meeting took the form of a debate, the subject for the evening being "The Top Dressing of Pasture Lands *versus* No Dressing." After interesting arguments had been brought forward by both teams of delegates, the Chairman decided in favor of the affirmative side, which was ably presented by Messrs. H. R. Meyer and S. Cuming, while Messrs. C. Pitt, K. B. Kirkham, and R. W. Haines supported the negative side of the subject.

CHERRY GARDENS, August 21st.—Mr. G. D. Basey read a paper recently read at the Longwood Branch, "Potato Growing," and an interesting discussion followed.

MILANG, April 14th.—Twenty-two members and two visitors attended the April meeting, when a paper, "Cultivation and Harvesting of Peas" was read by Mr. H. Warner.

A further meeting was held on May 12th, when Mr. W. S. Day contributed a paper, "The Farm and Farm Management," which was read by Mr. A. D. Matheson. An interesting discussion followed the reading of the paper.

MORPHETT VALE, August 23rd.—Mr. A. Furniss read a paper, "Better Utilisation and Land in this District," and an interesting discussion followed.

TO FORDSON OWNERS.

— FIT —

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MOUNT PLEASANT, August 10th.—After the Hon. Secretary (Mr. W. T. Vigar) had presented the annual report, and the officers had been elected for the ensuing year, members inspected experimental plots in connection with the top dressing of pasture lands that were being carried out by the Hon. R. T. Melrose. Members were considerably impressed with the improvement that was noticeable in the manured plots over those that had not received any fertiliser, which distinctly showed the advantages of top dressing pasture lands in the Mount Pleasant district.

NARRUNG, August 27th.—An interesting address, "Observations on Agricultural Methods Abroad," was delivered by Mr. W. Howie to an attendance of 17 members and two visitors. Other matters of current interest were also brought before the meeting for consideration.

PORT ELLIOT, August 22nd.—The delegates to the Conference of Southern Branches gave a report of the proceedings of the Conference, and an interesting discussion followed. The subjects "Rabbit Destruction," "Sheep Dipping," and "Spraying Fruit Trees" were also brought before the meeting.

RAPID BAY, August 4th.—Mr. G. C. Cant delivered an address, "Depletion of Pasture Lands," and read extracts dealing with the same subject. An interesting discussion followed.

SOUTH-EAST DISTRICT.

ALLANDALE EAST.

August 24th.—Present: 11 members.

TREE PLANTING.—"If every landholder and farmer planted a good number of trees each year they would be doing something to improve the value and appearance of their holdings" said Mr. M. McCabe in a paper dealing with the above subject. Not only did clumps of trees and hedges add to the value of the property, but they provided a much needed shelter for stock. The corners and stony patches of paddocks could be planted with suitable trees, and he also thought it would be a good plan to plant avenues of trees along the main roads, especially those roads that intersected cold and bleak flats. The first care in the planting of the trees was to see that the young plants were protected from stock and vermin. Some weeks before the actual planting of the trees, square holes should be dug in the ground and the subsoil loosened with a crowbar. When planting, the roots of the trees should be puddled in a thick mixture of earth and water, and the roots spread out to the fullest length If the earth in the centre of hole was made somewhat higher than the outside edges the roots would have a tendency to strike downwards. A damp and dull day should, if possible, be selected for the planting of the trees, and when that work had been completed three pegs should be driven into the ground around the trees and a piece of old bagging tacked on to the pegs to protect the tree from the wind and hail. When fine weather commenced the bagging could be removed. During the first summer, the young trees should be occasionally watered, and when once established the trees would require no further treatment, except to keep the grass and weeds in check. Relating his experiences with the planting of different kinds of trees, Mr. McCabe said Remarkable pines should not be planted within a chain and a half of gardens or buildings. Yate gum had proved a very hardy and rapid growing tree. Wattles could be sown on practically any class of land. Before sowing, boiling water should be poured over the wattle seed, and it should be allowed to remain in the water over night. For hedges he favored tree lucerne, cypress, pittosporum, boobialia. Boxthorn made a good breakwind, but it should be kept under control, because there was a danger of it spreading and providing a harbor for vermin. In the discussion that followed, Mr. Griffin said he had found stock very fond of tree lucerne. He agreed that pines should not be planted near a house or garden. They robbed other plants of soil moisture, and the needles from the trees were a constant source of trouble in the gutters

of the house. He had found the Yate gum and Mountain ti-tree excellent shelter trees. Mr. Kieselbach said the stringybark was a good shelter tree for the stock in summer. Rabbits did not damage the young trees to any appreciable extent, and fire did not have any harmful effects on the older trees. Stringybark trees could be transplanted if one were careful to move the earth with the tree. Mr. Yateman said pepper trees provided good shelter, and the cypress the best hedge. He had found it a good plan to roast wattle seeds in a hot oven before planting. Mr. McCabe said pine trees made good growth on sandy land and that wormwood made a good hedge for calf paddocks. Tree lucerne hedges should be grown from the seed. Transplanting the young plants from a seed plot was not a very successful method of growing the hedge. Mr. Laslett favored wormwood for a hedge. It afforded excellent protection for the garden, was shallow rooted, and did not rob the soil of moisture. Boxthorn and Mountain ti-tree also made good hedges, but the former soon became a nuisance unless kept under control. Mr. Sewart mentioned the revenue that could be derived from the cultivation of wattles and the value of the timber for firewood.

KALANGADOO (Average annual rainfall, 33in. to 34in.).

August 11th.—Present: 13 members.

SOME QUALIFICATIONS OF THE SUCCESSFUL FARMER.—Mr. W. Rogers, who contributed a paper under this heading, said the farmer's calling was one of the most honorable and useful. The more knowledge a farmer possessed the better were his chances of success. It was most essential for a farmer to be not only master of one branch of the business, but of all; therefore, education was most important. By that he did not mean that a man required a college education to be successful as a farmer, but rather to be a good judge of land, and have the ability to determine how to work the various classes of soil on his property. With judicious tillage and discrimination in the uses of fertilisers, and the selection of crops, is was possible to obtain profitable returns from poor land. On the other hand, if such land were not worked on sound lines, it might easily prove ruinous to the person who was depending upon what he could make off it for a living, even though he might have made an honest attempt to gain the best results. Good ploughing was not only pleasing to look at, but was also a factor in successful crop growing. If the land were properly turned with the plough, it made it better for the rest of the farm machines which followed right up to the completion of the harvest. Bad ploughing, which left ridges and hollows, was bad for the plant, because from the ridges too much moisture was evaporated, and in the hollows too much moisture was allowed to remain. There had been great improvements of late years in labor-saving machinery; and the farmer had to study carefully each machine. In dairying, a very important branch of farm work, the farmer required to be skilled, observant, and painstaking. The selection of cows and the breeding of young stock, the feeding and treatment of cows, and handling of the dairy products all required sound judgment and knowledge, and the same also applied to the profitable raising of pigs and poultry. Cleanliness in connection with all dairy work should be observed strictly. It should be the aim of the farmer to keep his land clean and clear of weeds and pests. The farmer also required a fair knowledge of the more common complaints to which stock were subject, and to know how to treat any animals that were sick, because it was not always possible to obtain the assistance of a veterinary surgeon. The farmer, to be successful, should also possess integrity and be industrious. He required to be methodical and to attend to his duties throughout the year, because each month the work on the land varied, and should be done in its turn. If that were done the farmer would get through an immense amount of work with satisfaction to himself and without feeling tired and overworked. On the other hand, if he permitted work to be put aside, he would find that he could not recover lost time, except by rushing and skimping the work. Many farmers disregarded social obligations, but if possible that should be avoided, because a man who practically cut himself off from his fellow men was not a good, nor desirable citizen.

MOORAK.

August 23rd.—Present: eight members.

NOXIOUS WEEDS AND DIRTY FARMS.—Mr. J. P. Mahoney, who read a short paper dealing with this subject, said it was very discouraging for the farmer who used his best endeavors to keep his farm free from troublesome weeds, to see his neighbor making no effort to keep weeds under control. Many of the weeds that were a source of annoyance to the farmers had been introduced into the district with various kinds of seed, and every farmer should be constantly on the lookout to keep under control any new seeds that might make their appearance. Mr. A. Kilsby mentioned that he had found seed wheat badly infested with wild radish. Every farmer should do his share in keeping the weeds under control. Mr Dickson stated that every year he found fresh weeds making their appearance on his farm. Mr. Barry impressed on members the importance of grading seed prior to sowing, and considered the harvester a bad machine for spreading the seeds of weeds. The Field Officer for the South-East (Mr. E. S. Alcock) said the Noxious Weeds Act was not enforced as strictly as it should be, and because of that fact careless farmers did not trouble to control the spread of weeds on their farms.

TATIARA (Average annual rainfall, 19in.).

August 25th.—Present: 11 members.

CARE OF HARNESS.—In the course of a paper, "Harness, Its Use and Abuse," Mr. A. Milne first referred to the collar. The subject of the prevention of sore shoulders was one that was frequently discussed by farmers, and very often the practice of cutting a hole in the lining and pulling out some of the straw was suggested. He strongly deprecated that practice, because the foundation of the collar was undermined, and it soon lost its shape. Not only that, but the pieces of straw that poked through the hole were a source of constant irritation to the sore on the shoulder of the horse. If the farmer decided to cut the lining, some of the straw should be removed, but the hole should immediately be covered with a piece of basil leather. The speaker was of the opinion that the best preventive of sore shoulders was to see that the horses were properly fed and nourished. If a horse contracted a sore shoulder, the collar should be lined and stuffed with horsehair, but the place covering the sore should not be stuffed, but pulled in and covered with a piece of leather, care being taken to keep the piece of leather thoroughly oiled. Nothing was better for preserving the leather than neatsfoot oil. A good harness dressing could be made by boiling neatsfoot oil and mutton fat, to which had been added a little beeswax and fat black. Old harness should be oiled without being washed. The harness should be hung in a dry shed. Fairly wide pegs should be used for the collars. Collars that were not in constant use hould be buckled and placed flat on the rim to keep them in shape. Mr. King expressed a preference for leather-lined collars. Mr. Bond stated that wattle-bark solution was a good cure for sore shoulders. Mr. Daenke suggested the use of oilcloth lining to cover the sore, and washing the collar and shoulder of the horse after work.

KALANGADOO (WOMEN'S), August 11th.—The inaugural meeting of the above Branch was held in the local institute, on Saturday, August 11th. Fourteen members were present. Mr. D. W. Tucker, a member of the Kalangadoo Branch of the Agricultural Bureau, attended the meeting and delivered an address dealing with the work of the Agricultural Bureau. The election of officers took place, and it was decided to hold future meetings of the Branch on the second Saturday afternoon of each month.

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

No. 4. NOVEMBER 15, 1923. VOL. XXVII.

Published Monthly by the Department of Agriculture.

Edited by H. J. FINNIS.

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All communications to be addressed:
"The Editor, Journal of Agriculture, Victoria Square, Adelaide."

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G. F. JENKINS,
Minister of Agriculture.

POINTS FOR PRODUCERS.

Distemper.

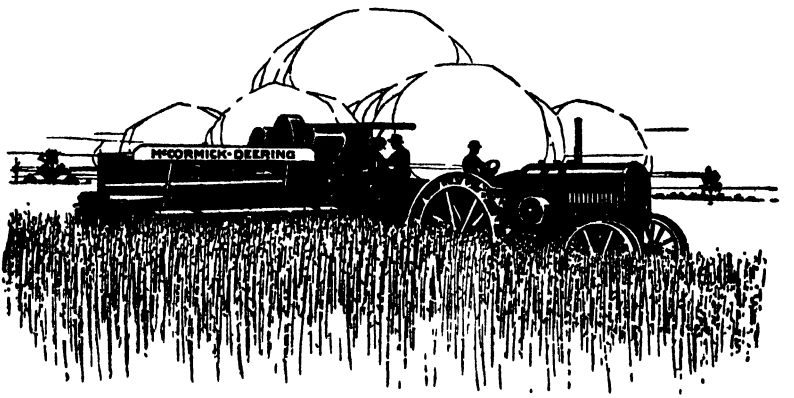
Distemper may manifest itself at any period of a dog's life, but it more commonly occurs in puppies from eight to ten weeks old. It may occur under any conditions, but particularly where other animals may have been affected on the property. The first signs noticed, according to the officers of the Stock Department, are those of dullness and loss of appetite. In the course of a few days other symptoms will develop, occurring in one of three forms, known as the respiratory, digestive, or nervous. In the first form, discharge of mucus is noticed from the nose, and cough. The second may be shown by vomitting and diarrhoea, and the third, nervous twitching. Treatment in the case of the first form consists of giving spirits of ether nit., 1½ozs.; soda hypo sulphate, ½oz.; and water, 6ozs.; one tablespoonful three times a day. For the second form, soda bi-carb., 1 dram; bismuth sub-carb., 1 dram; alum sulphate, ½ dram; glycerine, 4 drams; water, 4ozs; half a teaspoonful every hour. For the third form, potassium bromide, bot.; bi-carb., 1 dram; mag. sulph., 3 drams; water, 1oz.; half a teaspoonful every four hours. In the early stage it is advisable to administer a teaspoonful of castor oil. Sometimes a chronic twitching of the nerves and muscles, known as chorea, persists.

Sheep Lung Worm.

Draining marshy land, fencing waterholes or pools, watering only from troughs, grazing lambs ahead of the sheep to prevent them ingesting fouled food, and avoiding, when practicable, fouled paddocks, are suggested by the Assistant Government Veterinary Surgeon as preventive measures against lung worm in sheep.

Treatment when the animals are already infected is not altogether satisfactory. Sulphur fumes, or fumes given off from iodine (generated by placing as much as will go on a 3d. bit on a hot brick) in a bag, into which the animal's head is inserted, can be tried. Care, of course, is needed to obviate suffocating the animal undergoing treatment. The sulphur fumes can be generated in a small shed, fairly airtight, into which the animals are placed, a number at a time, a few minutes being allowed for each fumigating. An attendant must always be present to see that the animals are not suffocated.

Internal treatment consists of copper sulphate solution, made as follows:—4ozs. of clean crystal dissolved in a pint of boiling water, afterwards adding 3 gallons of water. This makes enough for 100 sheep. The dose for lambs is 1½ozs., and for sheep up to 3ozs. The treatment should be repeated in a week's time.



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Subterranean Clover.

Subterranean clover is quite a good collector of nitrogen, and considerably improves land for other crops. To establish this clover to best advantage it should be sown in the autumn, so that the first useful rains—the late March or early April—germinates the seed. Failing this early germination, the growth during the first year is rarely very abundant. Wet soils, provided that they do not get covered with inches of water, will grow this clover fairly well, but best results are got away from the bottoms of the valleys in our hilly districts.

"Your district," remarked the Superintendent of Experimental Work (Mr. W. J. Spafford) to a correspondent at Laura, "should be able to make a success of growing this clover, particularly on the arable land worked on a rotation, such as:—1st year, subterranean clover; 2nd year, subterranean clover; 3rd year, cereal crop."

PUBLICATIONS RECEIVED.

"The Diseases of Farm Animals in New Zealand."—A book of 500 odd pages, of handy size, good type, and well bound, bearing the title, "The Diseases of Farm Animals in New Zealand," by Lieut.-Colonel H. A. Reid, O.B.E., F.R.C.V.S., D.V.H., F.R.S.E., Pathologist and Bacteriologist to the Department of Agriculture, New Zealand, has been issued by Messrs. Whitcombe & Tombs, Ltd. The title adequately indicates the nature of the contents, the value of which is added to by illustrations, a well-arranged index, and appendices giving extracts from the Stock Acts of New Zealand.

"Pigs."—The Rolls House Publishing Company, Limited, London, have issued a publication, "Outdoor Pigs; How to make them Pay; By the leading authorities on Modern Pig Keeping." The book (150 pages) consists of a compilation of articles by different authors, under such titles as, "Selection of Stock," "General Management," "Foods and Feeding," "Marketing," "Common Ailments." It contains numerous illustrations, descriptions of breeds, list of breed societies, and a general index. Published price, 2s. 6d.

"The Irish Economist."—"The Irish Economist: A Quarterly Journal of Co-operative Thought and Progress," is issued by the Co-operative Reference Library, Plunkett House, Dublin. Published price, 2s. nett.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Replies supplied by ALAN H. ROBIN, B.V.Sc., Government Veterinary Officer.]

"J. W. M.," Mindarie, is watering stock from a tank that was filled with water before the tar with which it was painted was thoroughly dry, and asks if such water will cause any injury to the stock.

Reply—Tarry water will not affect the stock.

"E. C. O.," Penong, has mare in poor condition, rough coat, running on grass, and has not worked for four months.

Reply—I would recommend you to have the mare brought in off the grass and get her teeth looked to. They will probably want dressing up. Then starve her for 18 to 24 hours, and give a good dose of physic, either an aloes physic ball or a drench of raw linseed oil 1 pint to 1½ pints, turpentine 4 tablespoonfuls. Keep her on soft feed while the physic is working, and after the effects of the physic have worked off, turn her out again on good grass feed for a time.

"J. F.," Two Wells, has cow with large hard lump on off side of brisket.

Reply—The condition you mention is probably a tumor of some kind, probably fibrous. So long as it does not inconvenience the cow, it may be left alone, but if it continues to show further increase in size it might require to be removed by a qualified veterinary surgeon.

Mr. W. Fahey, Box 45, Spalding, asks information regarding cow with a swelling under the jaw, which gathered and broke.

Reply—The cow had an abscess such as frequently occurs in this region from the penetration of grass seeds from the mouth. The milk will be fit for use as soon as the abscess has healed up. You should dress it daily with disinfectant lotion such as carbolic acid or lysol—one tablespoonful to a pint of water. See that the abscess drains properly, and if necessary enlarge the opening for the purpose of allowing the discharge to escape.

Hon. Secretary, Parilla Well Agricultural Bureau, Pinnaroo, asks the value of Stockholm tar as a remedy for horses with sand.

Reply—Tar was at one time considered a valuable remedy for many ailments of stock, but I have no personal experience of its use for the matter you inquire about. I would not credit it with much value.

"H. O.," Melrose, has six-year-old mare in good condition, but labors in her breathing after being driven quickly.

Reply—Your horse is probably broken winded, and there may be some heart affection also. Give her a spell, and add 1oz. of liquor arsenicalis to the feed once a day for a fortnight. Broken wind is incurable, and treatment can only be palliative. Feed and water frequently and in small quantities at a time. Do not put her to work on a full stomach. Avoid feeding on dry hay, but give instead freshly cut grass or lucerne.

"F. C.," Clare, asks (1) cure for cow pox and (2) restless on front legs following an attack of mammilis.

Reply—(1) I would recommend you to commence any treatment by first, prior to milking, cleaning the affected udder and teats thoroughly by bathing with a warm solution of boracic acid in boiled water, then dry thoroughly and gently. After milking, wipe clean and dry, and apply thinly over the parts affected a little of any antiseptic ointment (*e.g.*, boracic acid ½oz., eucalyptus 30 drops, vaseline 4ozs.). This will act as a protective and healing agent, will prevent cracking, and make the animal more tractable for milking. Prior to each successive milking, wipe udder and teats clean and dry with a damp rag, and reapply the ointment after. Boil the rag used each time, or, better still, use a fresh, clean piece each time. Cow pox runs a pretty regular course, tending to recovery, and as a rule simple hygenic precautions and cleanliness will suffice to prevent any bad complications. (2) *Re* cow, restless on front legs. I am inclined to think that your cow is suffering from a deficiency of lime and phosphate in her nutrition, and, considering her age, you may not get satisfactory results from treatment. Feed her liberally on good feed, and supplement her ration with cereal foods, hay, &c. Add 1oz. salt daily to the feed, and allow her to have the following lick: —Ground bonemeal 6 parts, superphosphate 4 parts, sulphate of iron 1 part. If she does not show early signs of improvement, dry her off and fatten.

"E. B. P.," Murraytown, reports horse that "got at" a bag of oats. Very stiff and lame in front legs, and the hoofs are hot and swollen and cracked.

Reply—Your horse has had an attack of laminitis (commonly known as founder). Some red blister (red iodide of mercury 1 part, lard 8 parts) should be well rubbed into both coronets (avoid rubbing any into the heels). Apply it in the early morning, and keep the horse tied up short until evening. Do not coronet one day, the other the next day. The day after the blister is applied, wash it off with some warm water and soap, and smear on a little sweet oil or vaseline over the blister surfaces. Then turn her out for a spell of two or three weeks.

"Moissey," Private Bag, Morgan, asks treatment for lampas.

Reply—Lampas is a swollen condition of the palate immediately behind the top incisor teeth, and generally calls for no interference. The part may become inflamed and sore due to teething trouble, or indigestion, &c., and excepting where it occurs in young horses, due to teething, is merely a symptom of derangement of health, and a cooling drench or a couple of bran mashes with some Epsom salts added is usually all that is required to correct matters. If it is persistently sore and inflamed, the part may be lightly pricked with a lance, and a solution of salt and water rubbed on, or a strong solution of alum and water may be used without lancing. The old barbarous custom of burning out the lampas is now illegal.

"H. S.," Mantung, reports horse a "chronic bad doer." Animal keeps in poor condition whilst fed on good feed, and given the run of grass paddock.

Reply—The treatment must depend on the cause, and, unfortunately, you do not give any information in your letter. For example, you do not mention animal's age, the kind of work he is doing, whether you have noticed him slobbering, or is passing worms in his manure, &c. However, I would recommend, in absence of such information, that you give him the following drench:—Raw linseed oil 1 pint to 1½ pints, oil of turpentine 2ozs. Shake before giving, and starve the previous 12 hours. Then procure from a chemist ¼lb. of powdered nux vomica, and give a flat teaspoonful twice a day for 10 days, and stop for three days, and ten repeat. In addition, feed on good hay and chaff, with a little boiled grain added, and only give light work, and, if he is too free, use a check rein (tie back). It must be remembered that some horses, whether given the best of food and well looked after in general, can never be got to carry condition, more especially those animals of a nervous temperament. If you should write again for advice, please furnish any information which would help to diagnose the illness or injury, as the case might be.

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"N. S.," Jamestown, reports—(1) Heifer, calved five months ago, giving blood in milk. (2) Cow with enlarged quarter from which no milk can be obtained. (3) Cow with severe cut on the bottom of teat.

Reply—(1) *Re* heifer with blood in milk. This may be due to an injury to the udder, or it may be due to over rich feeding, or to some irritant plant taken in with the food a paddock. If there is any bruising or injury, you must treat it. If there is no apparent injury to cause the condition, I would suggest that you give your heifer a purgative dose (Epsom salts 1lb., ginger 2 tablespoonfuls). Reduce her feed somewhat, and try a change of pasture if possible. Keep udder and teats thoroughly clean, and milk her carefully and gently. (2) *Re* cow with lump in quarter. Apply frequent fomentations with hot water, afterwards massaging and kneading the quarter gently with the hands, using a little comphorated oil or ointment. This will tend to promote a softening and absorption of the hardness, and the kneading, along with frequent stripping, will stimulate the function of milk production. In your treatment, be at all times thoroughly clean. (3) *Re* cow with milk running away. The injury has torn out the small muscle at the bottom of the teat, which, when sound, acts as a valve, and holds the milk back from running away as it forms. Treat the wound with usual antiseptic measures. Results on healing will depend on the degree of damage done to the muscle. If it has been badly torn you will not get very good results; but if it was only slightly damaged, contraction after healing will probably take place enough to enable it to hold the milk.

"H. C. P.," Honiton, has young mare with thick discharge from nostril.

Reply—The horse undoubtedly has a chronic catarrh of the nostril, and the smell of the discharge being so objectionable, there probably is some parts of the bone at the back of the nostrils diseased, in which case it would be difficult for you to cure her quickly, and it would need the services of a qualified veterinarian. Try repeated inhalations of medicated steam up the nostrils. The probability of spread of infection to other horses by the way you mention is not very great, but even if only for hygenic reasons it would be better if you could avoid her drinking out of the same trough as the others. The discharge from the nostrils would contaminate the water.

Hon. Secretary, Green Patch Agricultural Bureau, reports light horse with bruised frog of front foot. Leg is swollen from the hoof to above the knee, and the hoof appears to be coming off.

Reply—So long as there is any discharge you can only treat the wound antiseptically, by soaking it daily in a bucket containing a weak solution of bluestone for about half an hour. When the discharge stops, and all soreness disappears, apply a mild blister to the coronet. Turn the horse out for a spell in a good grass paddock. If the hoof is going to come off, no treatment can stop it, but it would be a very serious sequel, and would necessitate destroying the animal.

"A. I. S.," Wilkawatt, has mare served 12 months ago, and up to date has not foaled; udder is carrying a good quantity of milk.

Reply—The mare is undoubtedly overdue. About 11 months, or 340 days, is the normal utero-gestation period. Since she is valuable, I would recommend you to try to obtain the services of a qualified veterinary surgeon, who would make a proper examination of the mare, and give proper treatment according to what his examination reveals. Any attempt to interfere by an unskilled man would have disastrous results.

"P. J. H.," Coulta, reports ram with "sexual laziness," age 4½ years.

Reply—Give the ram one-sixth grain of Yohimbine twice or three times a day dissolved in a little water. You should be able to obtain this from one of the wholesale druggists if you write them. Some little care needs to be exercisd in using this drug, and on appearance of any untoward symptoms, such as slobbering, paralysis, depression, or convulsions, discontinue its use immediately.

PROGRESS REPORT CONCERNING RECLAMATION OF SALT PATCH AT BERRI STATE EXPERIMENTAL ORCHARD.

[By Arthur J. Perkins, Director of Agriculture.]

Introductory.

From the earliest days of planting in January, 1911, "salt" showed signs of developing on a fairly steep slope of the Berri Experimental Orchard. Originally the area affected was insignificant in extent: in the course of time, however, it expanded slowly under the influence of irrigation, and by August, 1922, it covered approximately 3½ acres, which had become practically denuded of vegetation. This affected area has been shown on accompanying maps enclosed within dotted lines. It is an irregular, narrow tract of land, approximately 14 chains in length, and varying in width from 1½ to 3 chains.

We decided to attempt to reclaim this land, not merely in the interests of the State Orchard, the productiveness of which was gradually diminishing, but also with a view to supplying an object-lesson to settlers, whose orchards might be similarly affected. In the absence of a Departmental engineer, I have had to assume responsibility for this work.

After a careful examination of the land, it was decided that a system of under drains should be provided with a view to the removal of accumulating salt waters. It is hoped that subsequently flooding and leaching operations will help to sweeten the land and eventually restore it to its original fertility.

Preliminary work consisted in determining the surface and the clay subsoil contour lines: these are shown on separate maps herewith.

Surface Contour Lines.

An examination of the surface contours will show that the ground falls in two directions, namely, from north to south and, to a less degree, from west to east. Both falls are fairly regular: of the two the north-south fall is the steeper, being approximately 44in. to the chain, as against 20in. to the chain for the west-east fall.

It should be pointed out here that the salt patch originated in the north-west corner of the present affected area, and extended thence in a south-easterly direction, and not along the line of greatest fall: why this should have been so, will be made clear later on.

Clay Subsoil Contour Lines.

The subsoil contour lines are far more irregular than those of the surface. Similarly to the surface contours, they indicate a double fall

in the ground, namely, from north to south, and from west to east. The mean north-west fall is approximately 39in. to the chain, and the west-east fall about 15in. Hence, in both directions the general fall of the clay subsoil is less pronounced than that of the corresponding surface soil, and it follows that as we descend the declivity, in a southerly or easterly direction, the clay subsoil tends to come closer to the surface, and to hold up the underground waters.

Special attention should be paid to the clay contour lines in the extreme south-western corner of the salt patch. They are placed very close to one another and indicate a rapid fall in a southerly direction, which is continued beyond the boundaries of the salt patch. In a distance of 1½ chains we pass from contour line 97 to contour line 85, a fall of 12ft., corresponding to 96in. to the chain.

It is clear that in the past surplus drainage waters have found a natural outlet down this steep clay incline to the lower levels below, and prevented the extension of the salt patch in this direction. It is this fact which accounts for the extension of the salt patch in a south-easterly direction rather than in a southerly one.

Outlet for Drainage System.

The ultimate destination of the drainage waters would naturally be the river, which immediately adjoins the orchard; and normally they would have been made to reach it by means of pipes continuing the main drain in an easterly direction. We had, however, to give consideration to the fact that immediately to the south of the main salt patch, two minor patches, about two-fifths of an acre in area each, had recently appeared: and that there was every reason to believe that in the course of time they would increase in area and encroach upon adjoining sweet land. Eventually this would have meant a special drainage scheme to deal with these new patches. Fortunately, both patches lie in the course of a possible outlet for the main drain of the main salt patch: and ultimately, notwithstanding obvious grade difficulties, it was decided to extend the main drain through the minor salt patches and make it discharge its waters into an open channel to the south of them. It is hoped that this extension of the main drain will help to sweeten the two minor salt patches.

Question of Grade for Pipes.

Usually, under-drainage schemes are hampered by lack of fall in the ground: at Berri the position was reversed, and we had to face excessive falls and the danger of seeing washouts forming in the light open soil, and rapid wearing away of the soft tiles, under the influence of exaggerated velocity of the stream. I have assumed that for the purpose a fall of 3in. to 4in. to the chain might be considered ideal; and

in laying down the pipes have aimed not to exceed 9in., and, where possible, to keep within the 6-in. limit.

This policy has rendered necessary a more frequent use of inspection pits, which break the fall, than is usually adopted. And although these pits tend to raise the cost of the scheme, they present, on the other hand, inestimable advantages in an orchard where pipes are constantly exposed to being choked up by roots. Numerous inspection pits permit of an early discovery of accidents of this kind, and minimise difficulties in locating definitely the affected pipes

Size of Pipes.

In the matter of size of pipes, I was handicapped by the fact that a large number of 3in. and 4in. pipes were already on hand when I took the matter up. I am inclined to look upon 3in. pipes as rather small for drainage purposes, where irrigation is practised. Eventually the extension of the main drain which passes through the minor salt patches was given 6in. pipes, and the main drain itself 4in. pipes. For the latter I believe it would have been wiser to have faced the expense and secured 5in. pipes. The first section of most of the subsidiary drains has been supplied with 4in. pipes, and the balance with 3in. pipes.

It is to be observed that with the exaggerated falls available to us, the danger of silting up is greatly minimised and pipes of relatively small diameters will probably suffice.

Subsidiary Drains.

The main drain (pipe track No. III.), which runs close to the eastern boundary of the salt patch, receives five subsidiary drains having a south-easterly direction and more or less parallel one to the other. They follow the surface contour lines and empty into observation pits and not directly into the main drain. This arrangement presents the advantage of enabling us to detect without difficulty whenever one of the subsidiary drains is out of working order. All these drains, with the exception of pipe track No. IV., empty into observation pits in a straight line: in the latter case it has been found necessary to bend the pipes on a curve of not less than 21ft. radius.

DETAILS OF DRAINS.

Extension of Main Drain (pipe track No. I.).

This extension runs southwards from pit No. II. and empties into an open channel. It is 705ft. in length and consists throughout of 6in. pipes, the last 70ft. of which are glazed pipes cemented together: the latter come to the surface about 30ft. from the outlet. The outlet mouth is closed by a light sloping valve, which does not interfere with the flow of the water, but which checks small animals from having access

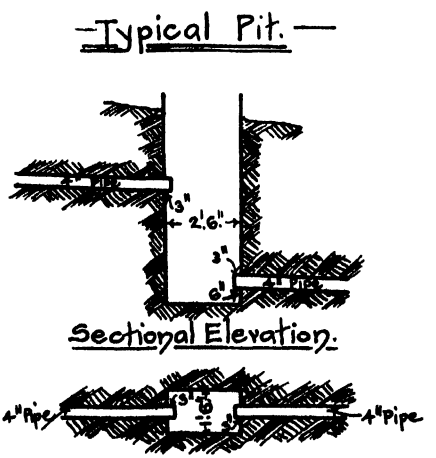
to the pipes. The mean surface fall between pit No. II. and the outlet is about 2ft. 6in. to the chain. In order to reduce this fall the line of pipes has been broken into four sections by means of suitably disposed observation pits.

These have been arranged as follows:—

	Distance. Ft.	Fall. Total. Ft.	Per Chain. Ft. Ins.
From Pit 2 to Pit 3	94	0.88	7.4
„ „ 3 „ „ 4	119	0.96	6.4
„ „ 4 „ „ 5	118	0.97	6.5
„ „ 5 „ „ 6	167	1.26	6.0
„ „ 6 „ outlet	207	2.23	8.5

I recognise the unwisdom of passing from a steep to a lesser grade, with resulting loss in velocity by the water, and where possible have avoided it. I believe, however, that the danger from the deposit of silt, resulting from change in velocity, tends to disappear when a pit is interposed between two changes in grade.

In order to secure safe grades for the pipes, we have been compelled to start them on the up-stream side about 5ft. from the surface and to continue them until the upper portion of the pipe came within 2ft. of the surface. This arrangement presents two objections which could not be avoided (1) on the up-stream side the pipes tend to dip unduly into the clay subsoil and (2) on the down-stream side the pipes tend to rise too much towards the surface. The first objection has been overcome by filling the trench with coarse gravelly material wherever necessary; the second one will have to be lived down.



The observation or silt pits are of rough lime concrete and rectangular in cross-section, being 2ft. 6in. by 1ft. 6in. In depth they vary with circumstances. The down-stream outlet pipe is 6in. above the floor of the pit, whilst the up-stream inlet pipe is opposite, but immediately above the outlet pipe.

A short line of 3in. subsidiary pipe extends to the north of this main drain and empties into observation pit No. II. It is 166ft. in length with an observation pit towards its centre. This line will intercept drainage waters in the south-eastern corner of the main salt patch.

Main Drain (pipe track No. III.).

The main drain practically traverses the main salt patch lengthways from end to end, along its eastern boundary, and empties into observation pit No. II. It consists of 861ft. of 4in. pipes: and as has already been stated 5in. ones would have been preferable. The total fall in this line is 18.58ft. representing 1.4ft. per chain. This fall has been reduced by means of four observation pits into which the subsidiary drains have been made to empty.

Distances and falls between the respective observation pits are as follows, working down stream:—

	Distance.	Fall. Total.	Fall. Per Chain.
	Ft.	Ft.	Ins.
Pit 10 to Pit 9	231	1.60	5.5
„ 9 „ 8	204	1.47	5.7
„ 8 „ 7	175	1.32	6.0
„ 7 „ 2	251	1.61	5.1

Subsidiary Drains.

The main drain and its extension (pipe tracks Nos. I. and III.) are fed by five subsidiary drains running more or less parallel to one another and emptying into observation pits of the main drain at acute down-stream angles. These are pipe tracks Nos. II., IV., V., VI., and VII. For the most part these subsidiary drains are embedded in the underlying clay and follow surface contours with a mean fall of 3in. to 4in. to the chain. Occasional irregularities in surface and subsoil contours have been met with and dealt with as circumstances indicated. These subsidiary drains will, therefore, tend to intercept at right angles the downward flow of the salt-laden waters, and eventually transfer them to the main drain, whence they will be evacuated into the river.

Details concerning these drains are shown below:—

	Length. Ft.	Number of Sections.
Pipe Track No. II.	718	3
do. IV.	625	3
do. V.	600	3
do. VI.	464	2
do. VII.	177	1

SOLUBLE SALTS PRESENT IN THE SOIL PRIOR TO RECLAMATION.

The soluble salts present in the soil prior to reclamation have been determined by analysis. Figures bearing on this question, indicated below, have been calculated on the assumption that an acre-foot of soil weighs 3,250,000lbs.

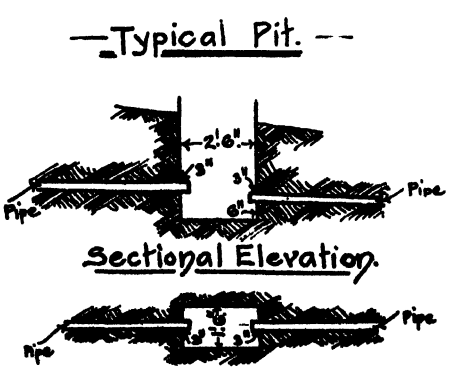
Soluble Salts in Sweet Soil Adjoining Salt Patch.

Table I. refers to a patch of sweet soil immediately above and adjoining the salt patch, on which no vegetation troubles have hitherto been noted. It may be taken to represent the condition of the present salt patch prior to the spread of salt under the influence of irrigation Samples of soil have been taken to the level of the underlying clay.

Table I.—*Showing soluble salts present in sweet land on October* 12, 1922.

	1st Foot.	2nd Foot.	3rd Foot.	4th Foot.	5th Foot.	Total In 5 Feet.	Soil Percentages In 5 Feet.
	Pounds Per Acre.						
Calcium Carbonate	349	423	400	318	313	1,803	0.011
Magnesium Carbonate	163	440	432	416	477	1,928	0.012
Sodium Carbonate	317	81	64	431	704	1,597	0.010
Magnesium Sulphate	41	57	—	—	—	98	0.001
Magnesium Chloride	8	—	—	—	—	8	—
Sodium Sulphate	155	106	228	366	379	1,234	0.008
Sodium Chloride	139	196	172	236	185	928	0.006
Undetermined	40	89	48	251	43	471	0.003
Totals	1,212	1,392	1,344	2,018	2,101	8,067	0.051
Soil Percentages	0.037	0.043	0.041	0.062	0.065	0.050	—

It will be noted, therefore, that in closely adjoining soil, on which no salt trouble is at present apparent or anticipated, the first 5ft. of soil contain about 8,000lbs. of soluble salts to the acre. Of these about 4,200lbs. are innocuous (calcium carbonate, magnesium carbonate and



undetermined), leaving a balance of about 3,800lbs. of salts usually harmful to vegetation when allowed to reach a dangerous state of local concentration.

Of these the most important in quantity and most dangerous in quality is sodium carbonate (about 1,600lbs.). It will be noted that the bulk of it is placed in the fourth and fifth foot of soil, although the first foot is not without its share.

Next to sodium carbonate, sodium sulphate (white alkali of the Americans) is most in evidence (1,200lbs). It is more evenly distributed through the soil, and in present proportions is not likely to lead to trouble.

Sodium chloride, or common salt, occupies the third rank from the point of view of quantity (900lbs.). This salt, too, is fairly evenly distributed and in its present quantities not likely to cause vegetative troubles.

We may conclude, I think, that the great distance of the underlying clay from the surface, and consequent natural good drainage conditions, have served to protect this soil from dangerous accumulation of saline matter. It is worth noting in this connection, that contrary to what happens when salt is a source of trouble, the salt concentration decreases in proportion as we approach the surface. As to the development of black alkali (sodium carbonate), particularly in the lower depths of the soil, it is probably due to interaction of common salt and the calcium salts which are abundantly present.

Soluble Salts in Land Previously Barren but Now Carrying Coarse Herbage.

In Table II. are shown similar results for a soil upon which all vegetation had previously been destroyed by the action of salt, but which has since become covered with coarse grass. In this case the soil is 3ft 3in. above underlying clay.

Table II.—*Showing soluble salts in soil previously barren from action of salt, but now carrying coarse grass (October 12, 1922).*

	1st Foot.	2nd Foot.	3rd Foot.	Last 3ins.	3ft. 3ins. Total.	Soil Percentage.
			Pounds Per Acre.			
Calcium Carbonate	317	667	488	106	1,578	0.015
Magnesium Carbonate	146	195	212	57	610	0.006
Sodium Carbonate	277	707	301	—	1,285	0.012
Magnesium Sulphate	—	—	171	81	252	0.002
Magnesium Chloride	—	—	8	49	57	0.001
Sodium Sulphate	89	813	122	—	1,024	0.010
Sodium Chloride	610	716	692	114	2,132	0.020
Undetermined	171	187	72	49	479	0.005
Total	1,610	3,285	2,066	456	7,417	0.073
Soil Percentages	0.050	0.101	0.064	0.056	0.070	—

In this soil, formerly barren, but now carrying in winter rough herbage, we find soluble salts in quantities somewhat similar to those shown to be present in normally sweet soil—7,417lbs. as against 8,067lbs.—but distributed over 3ft. 3in. of soil instead of over 5ft. Hence, the mean percentage which was 0.05 in the normal soil is 0.07 in the soil at present under consideration.

The most striking feature in these results is, firstly, the relative sweetness of the first foot of soil, which undoubtedly accounts for the presence of coarse surface vegetation already referred to and, secondly, the high concentration of salts in the second foot. In the first foot we have a concentration of total salts equivalent to 0.05 per cent., and in the second foot of 0.101 per cent., i.e., more than double. But this concentration of soluble salts is even greater than the figures given in Table II. would appear to indicate. Actually, the greatest concentration has taken place between 18in. and 24in. from the surface, where it is represented by 1,814lbs. of salts in 6in. of soil, corresponding to a concentration of 0.112 per cent.

In the total soluble salts—7,417lbs. per acre—are included 2,667lbs. of innocuous salts, leaving a total of 4,750lbs. of injurious salts in 3¼ft. of soil, as against 3,865lbs. in 5ft. of normal sweet soil. Of these injurious salts, sodium chloride, or common salt, is represented by 2,132lbs., with a mean concentration of 0.02 per cent., which attains a maximum of 0.032 per cent. between 18in. to 21in. from the surface.

Next in importance comes sodium carbonate (black alkali) represented by 1,285lbs., and a mean concentration of 0.012 per cent. This salt reaches its maximum concentration 12in. to 15in. from the surface, where it is represented by 0.027 per cent.

Third in importance is sodium sulphate (white alkali) with a mean concentration of 0.01 per cent. Its maximum concentration is at 18in. to 21in. from the surface, namely, 0.037 per cent.

We are now in a position to realise why this soil, formerly completely barren, can now carry a winter covering of rough herbage. We must assume that earlier sterility arose from the alternating influenees of summer irrigation and summer surface evaporation, which tended to concentrate injurious salts within the reach of plant roots. This land has not been cultivated nor irrigated for 9 or 10 years: and under the influence of normal winter rainfall the bulk of the salts appear to have been washed out of the surface layers into the second foot of soil. Hence, surface-rooted winter herbage has been able first to germinate its seed, and subsequently to take root in the comparatively sweet surface layers. Should, however, irrigation be applied without providing for the removal of underlying salts by artificial drainage, it is certain that barrenness would once again resume its sway.

SOLUBLE SALTS PRESENT IN SOIL AFFECTED BY SALT (1_3 and M_3).

In the next table we have an analysis of soluble salts in a completely sterile portion of the salt patch. In this case the underlying clay is only 18in. from the surface, and the figures have been given for every 3in. in order to illustrate the condition of concentration of the salts.

TABLE III.—*Showing soluble salts present in barren portion of salt Patch* (1_3).

	1st 3ins.	2nd 3ins.	3rd 3ins.	4th 3ins.	5th 3ins.	6th 3ins.	1ft. 6ins. Total.	Soil Percentage.
				Pounds Per Acre.				
Calcium Carbonate	260	179	293	228	163	171	1,294	0.027
Magnesium Carbonate	—	146	219	73	154	146	738	0.015
Sodium Carbonate	—	89	57	—	—	—	146	0.003
Calcium Sulphate	5,728	—	—	—	—	—	5,728	0.117
Magnesium Sulphate	3,494	—	—	260	73	163	3,990	0.082
Sodium Sulphate	1,406	1,032	1,263	1,503	1,601	1,877	8,687	0.178
Sodium Chloride	11,375	2,933	3,616	4,119	4,022	4,144	30,209	0.620
Undetermined	106	276	114	130	98	98	822	0.017
Total	22,369	4,665	5,567	6,313	6,111	6,599	51,614	1.059
Soil Percentages	2.753	0.573	0.685	0.777	0.752	0.812	1.059	—

A very cursory examination of Table III. will serve to show how great is the difference between the proportion of soluble salts present in completely sterile soil and soil capable of supporting rough surface vegetation. In the present instance we find the enormous quantity of 51,614lbs. of soluble salts, or over 23 tons, distributed over an acre only 18in. in depth, and representing a mean concentration of 1.059 per cent. True, in this total all of the salts cannot be described as actively injurious, notably 5,728lbs. of calcium sulphate, the constituent of gypsum. Nevertheless, they must help to increase the concentration of the soil moisture, and to that extent may prove indirectly hurtful to struggling vegetation. But even if we eliminate calcium carbonate, magnesium carbonate and calcium sulphate, there would still remain 43,854lbs., or close on 20 tons, distributed over 18in. of soil, with which reclamation operations will have to deal.

Of the injurious salts present, sodium chloride, or common salt, represented by 30,209lbs., is the most important. Fortunately its great natural solubility renders leaching operations comparatively simple. It should be noted that in October, 1922, over a third of the common salt was concentrated in the first 3in. of soil: the balance was evenly distributed over the remaining 15in.

Next in importance is sodium sulphate (white alkali), represented by 8,687lbs. evenly distributed throughout the 18in. This, also, is a very soluble salt and should offer no difficulty to leaching operations.

Magnesium sulphate, also a soluble salt, is concentrated mainly in the first 3in.

Fortunately, sodium carbonate is represented very sparingly in this soil, its mean concentration not exceeding 0.003 per cent. This must probably be attributed to the presence of large quantities of calcium sulphate in the soil, which, however, in so far as we are aware, has not been added to the soil artificially.

It should be noted finally how intense is the action of surface evaporation under upper river conditions in drawing to the surface of bare, untilled land the bulk of the soluble salts present in the soil. Already towards the end of October, i.e., before the intense summer heat has set in, we find 22,369lbs., or close on 44 per cent. of the total amount of salt present, concentrated in the first 3in. of soil: we must leave it to the imagination as to what would be the condition of this soil towards the end of summer Below this first 3in. the distribution appears to have been fairly even.

Finally, we have for consideration samples of soil (M_3) taken from another barren spot in the salt patch In this case the underlying clay is only 1ft. 3in. from the surface

TABLE IV.—*Showing distribution of soluble salts in barren spot (M_3) of salt patch.*

	1st 3ins.	2nd 3ins.	3rd 3ins.	4th 3ins.	5th 3ins.	1ft. 3in. Total	Soil Percentage.
	Pounds Per Acre.						
Calcium Carbonate	98	81	114	49	49	391	0.010
Magnesium Carbonate	49	33	73	89	89	333	0.008
Sodium Carbonate	317	528	456	601	618	2,520	0.062
Sodium Sulphate	228	195	146	171	154	894	0.022
Sodium Chloride	1,211	1,089	804	869	715	4,688	0.115
Undetermined	260	154	154	65	33	666	0.016
Total	2,163	2,080	1,747	1,844	1,658	9,492	0.233
Soil Percentages	0.266	0.256	0.215	0.227	0.204	0.234	—

This particular portion of the salt patch (M_3) differs from the former (I_3) in the following points:—

(1) Absence of calcium sulphate and corresponding presence of sodium carbonate (black alkali).

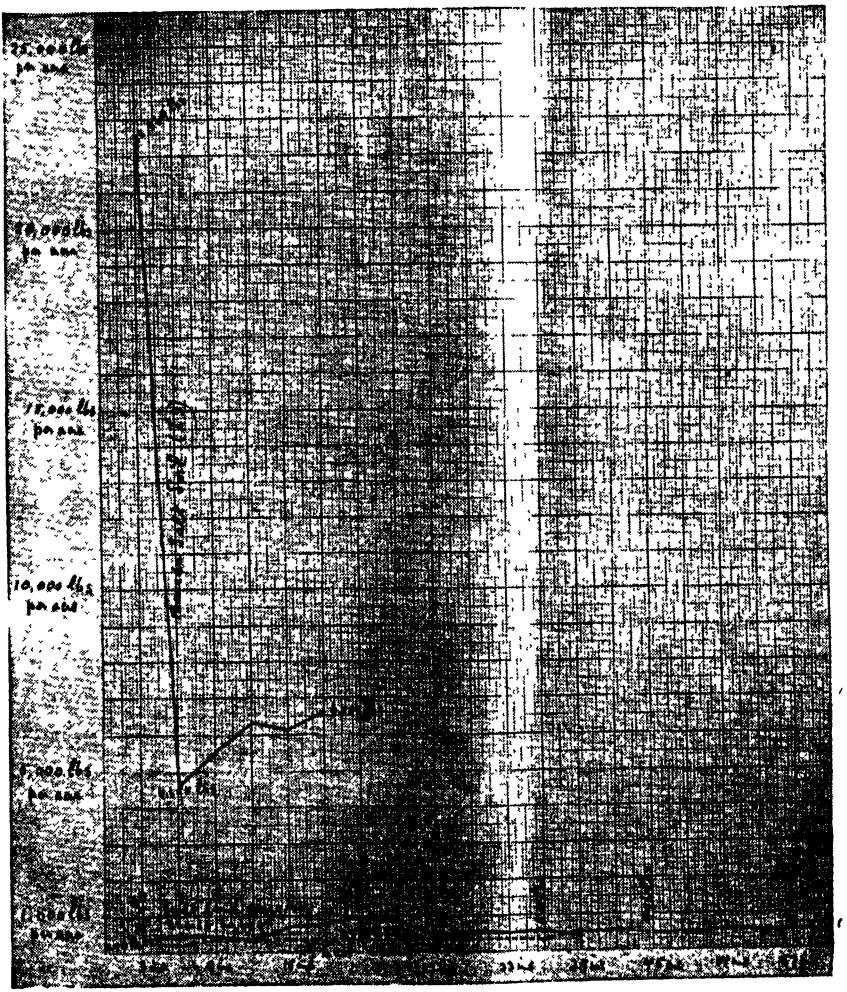
(2) Appreciable but less marked concentration of soluble salts in the surface layers.

(3) Smaller relative quantities of soluble salts, represented by a mean concentration of 0.234 per cent. as against 1.059 per cent.

It should be noted that again common salt (sodium chloride) is the chief injurious salt present, followed in this case by sodium carbonate at the rate for the latter salt of over one ton to the acre.

COMPARISON OF SALT DISTRIBUTION IN THE THREE TYPES OF SOIL.

Finally, I have endeavored to give graphic illustration to the distribution of salts in these three types of soil, namely, (1) barren salt land; (2) land previously barren, but now carrying coarse herbage; and (3) adjoining sweet land.

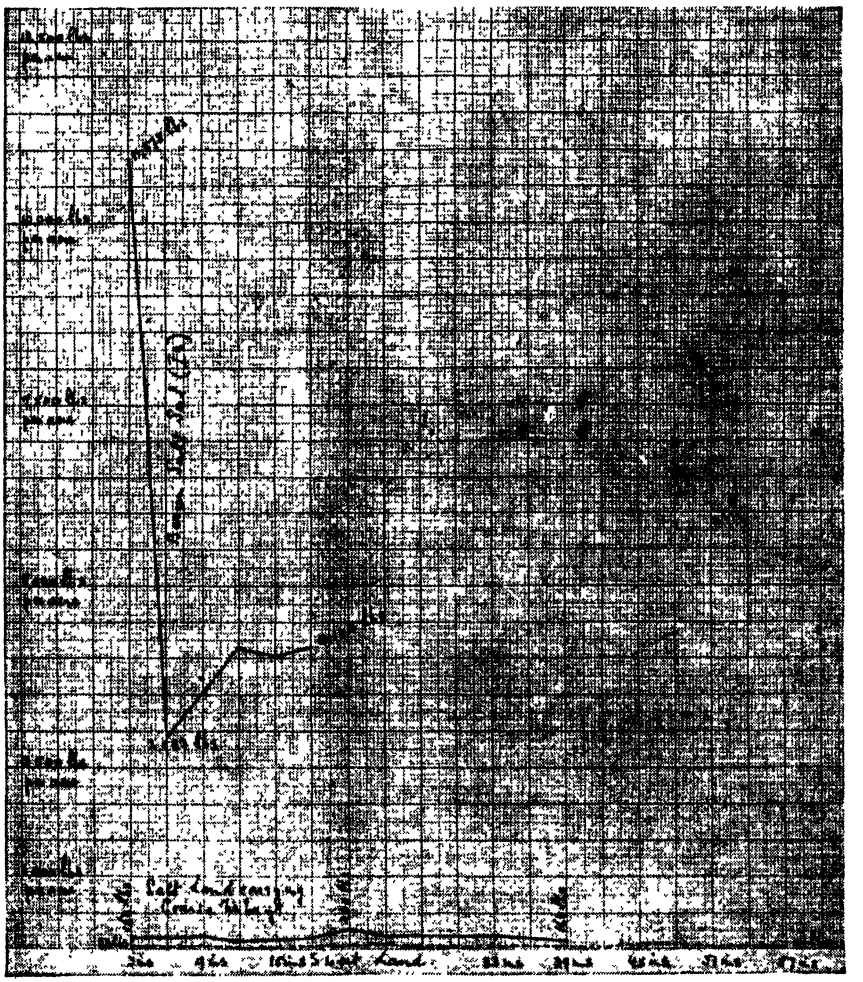


GRAPH 1,

Showing distribution of total soluble salts in lbs. per acre at intervals of three inches in depth for - (a) barren salt land, (b) land previously barren but now carrying coarse herbage, and (c) adjoining sweet land.

The total soluble salts present in each successive 3in. of soil has been indicated in lbs. per acre for each type of soil (graph 1), and similar data have been given for common salt (graph 2).

It will be noted how much shallower is the barren salt land (18in. above clay) than the adjoining sweet land (57in. above clay). Again, the concentration of both total soluble salts (22,369lbs. to the acre) and common salt (11,375lbs. to the acre) in the first 3in. of soil is



GRAPH 2.

Showing distribution of sodium chloride (common salt) in lbs. per acre at intervals of three inches in depth for—(a) barren salt land, (b) land previously barren but now carrying coarse herbage, and (c) adjoining sweet land.

strikingly illustrated for the barren salt land; similarly, the lower proportions in succeeding 3in. of soil are equally apparent. On the other hand, the almost horizontal lines for the sweet soil indicate great regularity of distribution of both total soluble salts and common salt.

Such, then, is the condition of the soil which we hope to sweeten gradually by successive leaching operations. Surplus irrigation waters will take into solution the soluble salts and convey them into the drain pipes, whence they will be evacuated into the river. In addition, the pull of the under drains will tend to counteract to some extent the influence of surface evaporation and will help to retain the salts in the lower layers of the soil, where they must prove less injurious to vegetation.

RESULTS FROM PARTIAL LEACHING IN 1922-23 SEASON.

The drains were not definitely laid until the end of the 1922-23 season: and it follows that leaching has been carried out under difficulties, and only to a limited degree. The results secured, however, have been fairly striking, and I propose giving a full account of them. It should be stated that a careful record of all water passing through the drains is being kept, and from time to time these waters are being analysed.

First Irrigation.

The first irrigation affecting this area, after the pipes had been partially laid, took place between the 13th and 16th of November: at the time pipe track No. I. and portion of No. II. only had been laid. The drains ran continuously from November 13th to December 12th, and evacuated during that time 24,235 gallons of water. During this period, the following quantities of saline matter were removed through the drains:—

Table V.—*Showing saline matter removed by drains between 13th November, and 12th December.*

Calcium Carbonate (lime)	28 lbs.
Magnesium Carbonate	60 „
Sodium Carbonate (black alkali)	138 „
Sodium Sulphate	164 „
Sodium Chloride (common salt)	351 „
Undetermined	23 „
Total,	764 lbs.

Second Irrigation.

The second irrigation took place between the 22nd and 25th of December. By this time pipe tracks Nos. I., II., III., and IV. were in working order. The drains continued running from 22nd December to 30th January, during which period they evacuated 68,996 gallons. The amount of saline matter removed from the soil thereby was as follows:—

Table VI.—*Showing saline matter removed by drains between 22nd December and 30th January.*

Calcium Carbonate (lime)	110	lbs.
Magnesium Carbonate	356	„
Sodium Carbonate (black alkali)	194	„
Sodium Sulphate	1,188	„
Sodium Chloride (common salt)	2,335	„
Undetermined	109	„
Total,	4,292	lbs.

Third Irrigation.

The third irrigation started on February 2nd and was completed on the 5th. The drainage system was practically completed by this time, and ran continuously from February 2nd to March 5th, during which period 41,431 gallons of water passed through the drainage system, carrying with it the following quantities of saline matter:—

Table VII.—*Showing saline matter removed by drains between February 2nd and March 5th.*

Calcium Carbonate (lime)	48	lbs.
Magnesium Carbonate	197	„
Sodium Carbonate (black alkali)	246	„
Sodium Sulphate	840	„
Sodium Chloride (common salt)	1,375	„
Undetermined	41	„
Total,	2,747	lbs

Special Irrigation.

A special cover-crop irrigation was given on 16th and 17th of March: thereafter, the drains ran between the 16th and 30th of March, during

which time they evacuated 7,755 gallons of water, containing the following quantities of saline matter:—

TABLE VIII.—*Showing saline matter removed by drains between March 16th and March 30th.*

Calcium Carbonate (lime)	11 lbs.
Magnesium Carbonate	53 „
Sodium Carbonate (black alkali)	35 „
Sodium Sulphate	202 „
Sodium Chloride (common salt)	332 „
Undetermined	9 „
Total,	642 lbs.

FIFTH IRRIGATION.

Autumn irrigation was practised on April 28th and 29th, after which drains ran continuously between April 28th and May 14th, during which time 25,853 gallons of water passed through them containing the following quantities of saline matter:—

TABLE IX.—*Showing quantities of saline matter removed by drains between April 28th and May 14th.*

Calcium Carbonate (lime)	24 lbs.
Magnesium Carbonate	64 „
Sodium Carbonate (black alkali)	67 „
Sodium Sulphate	132 „
Sodium Chloride (common salt)	260 „
Undetermined	28 „
Total,	575 lbs.

WINTER RAINFALL LEACHING.

Winter rainfall is never very heavy in the Berri district: nevertheless it is sufficient to lead to the removal by drainage of quite appreciable quantities of saline matter.

Last winter, between May 27th and July 30th, we registered 3.92in. of rain distributed over 29 rainy days. It follows that most of the falls were insignificant. In fact in no single instance was half an inch registered for 24 hours: and on only three occasions was there more than one-third of an inch for the same period; whilst on 12 days falls were below 10 points.

During this period of 67 days, over which no irrigation was practised, the drains ran continuously except for four days early in June. The total amount of water passing through them was represented by

45,787 gallons, which, if we suppose the drainage system to affect 9½ acres would represent five to six per cent. of the rainfall actually reaching the land.

I am not in a position to state definitely the quantity of saline matter removed in this water, as all analytical data are not yet available Nevertheless, on a close approximation, I estimate the results to have been somewhat as follows:—

TABLE X.—*Showing estimated saline matter removed by drains between May 27th and July 30th, as result of winter rains.*

Calcium Carbonate (lime)	84 lbs.
Magnesium Carbonate	394 „
Sodium Carbonate (black alkali)	338 „
Sodium Sulphate	1,549 „
Sodium Chloride	2,703 „
Undetermined	84 „
Total,	5,152 lbs.

It will be agreed in the circumstances that the effects of winter rain leaching have been fairly appreciable.

TOTAL SOLUBLE SALTS REMOVED FROM THE SOIL BETWEEN MID-NOVEMBER, 1922, AND END-JULY, 1923.

The total quantity of soluble salts removed from the soil by drainage as the result of both summer irrigation and winter rains, may be summarised as follows:—

TABLE XI—*Showing draining results at Berri between mid-November, 1922, and end-July,* 1293.

	Summer Irrigation.	Winter Rains.	Total.
Water Through Drains	168,270 gls.	45,787 gls.	214,057 gls.
Calcium Carbonate	221 lbs.	84 lbs.	305 lbs.
Magnesium Carbonate	730 „	394 „	1,124 „
Sodium Carbonate	680 „	338 „	1,018 „
Sodium Sulphate	2,526 „	1,549 „	4,075 „
Sodium Chloride	4,653 „	2,703 „	7,356 „
Undetermined	210 „	84 „	294 „
Total,	9,020 lbs.	5,152 lbs.	14,172 lbs.

Thus, then, in a preliminary campaign, which presented the disadvantage that effective drainage throughout the system did not start until late in the season, we removed from the soil about 6¼ tons of soluble saline matter. It is anticipated that in the coming season, with

the drainage system in full working order from the outset, results will be even more satisfactory.

It should be noted that over 80 per cent. of the saline matter removed consisted of common salt and white alkali, as might indeed have been anticipated from the composition of the soluble salts known to be present in the soil. It is satisfactory to note, too, that appreciable quantities of black alkali (sodium carbonate) passed into the drains, implying that heavy and costly dressings of gypsum will be unnecessary. It is clear that the comparatively light texture of the land protects it from mechanical injury by this salt.

All analytical work connected with this report has been conducted in the laboratory of the Director of Chemistry, whilst the supervision of the work and the collection of data have been in the able hands of Mr. C. G. Savage, Manager of the Berri Experimental Orchard.

This report may be looked upon as a preliminary report which will be followed by others according as results and circumstances appear to warrant them.

SUMMARY.

The results indicated herewith may be summarised as follows:—

1. An attempt has been made to reclaim 4 acres to 5 acres of orchard land rendered sterile from the rise of salt subsequent to the application of irrigation.

2. The areas concerned are situated on a moderate hill slope: surface contours indicate a mean surface fall of 44in. to the chain in one direction, and 20in. in another.

3. Corresponding clay subsoil contours indicate mean falls of 39in. and 15in. respectively.

4. It follows that the clay tends to rise against the surface grade, giving rise to defective drainage conditions, and in time to salt troubles.

5. A complete drainage scheme has been laid out to cope with this difficulty.

6. Undue surface steepness has been overcome by the use of a succession of observation pits: where possible, a grade of 3in. to 4in. to the chain has been adopted for the pipes, and in no case has a grade of 9in. to the chain been exceeded.

7. According to position, 3in., 4in. and 6in. pipes have been used.

8. All subsidiary drains have been made to empty into observation pits.

9. Sweet soil adjoining the salt patch has been shown to have a mean concentration of soluble salts of 50 parts in 100,000 parts, 10 of which are black alkali, 8 white alkali and 6 common salt.

10. In soil previously barren, but now carrying rough winter vegetation, salt concentration in first foot of soil corresponds to ·50 in 100,000 parts, but in the third six inches to 112in. 100,000 parts. It is inferred that seven or eight years of winter rains, and the absence of summer irrigation have sweetened the first foot of soil, and rendered shallow-rooted surface vegetation possible.

11. In two barren portions of the salt patch the mean salt concentration was found to be 1,059 and 234 parts respectively in 100,000.

12. In one spot 18in. of soil carried soluble saline matter at the rate of 51,614lbs. to the acre; and in another 15in. of soil carried soluble saline matter at the rate of 9,492lbs. to the acre.

13. In both cases common salt 30,209lbs. and 4,688lbs., respectively, to the acre was the chief constituent.

14. Black alkali was present abundantly on one spot—2,520lbs. to the acre—but not in another—146lbs. to the acre. Its absence in the latter is attributable to the presence of an abundance of calcium sulphate in the soil.

15. Leaching operations started late in the season, but were responsible for the removal of 9,020lbs. of soluble salts: winter rains were responsible for an additional 5,152lbs., representing in the aggregate 6⅓ tons of soluble saline matter.

16. The chief constituents removed were common salt (7,356lbs), sodium sulphate (4,075lbs.), and sodium carbonate (1,018lbs).

17. It is anticipated that the results will be more satisfactory in the coming season, as the drainage system will be in good working order from the outset of irrigation operations.

APPENDIX.

The Manager of the Berri State Orchard (Mr. C. G. Savage) supplies the following additional information:—

Plants found growing on the area in the salt patch, now carrying coarse winter herbage, but previously sterile, and concerning which analytical data have already been given, are chiefly—sow thistles, barley grass and several species of annual salt bushes.

Several fig trees in the neighbourhood of the southern end of pipe track No. III. lost all their leaves in December under the influence of the salt. The drains were not completed in this section until early January. Late in February these trees sent out new leaves, and continued covered with healthy green foliage until late autumn. Similarly, orange trees which were dying off in the southern minor salt patch, made new growth last summer, and now present generally a much healthier appearance.

Barley was sown over the whole of the salt patch and on the land immediately adjoining it in April, 1923. The barley germinated normally on the adjoining sweet land and on land within the salt patch which had previously carried coarse herbage, and also along the furrows used for applying the last irrigation.

Barley did not germinate on the bare salt land until the 21st of June, i.e., 62 days after seeding, over which interval 2.34in. of rain had fallen and more or less sweetened the surface layers of soil. This barley continued to grow until hot weather set in, when it was scorched off. It is clear, therefore, that there is still much salt to be removed

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MALTING BARLEY.

In forwarding a few samples of malting barleys to the Department of Agriculture, for trial in the South-East, Messrs. Tooth & Company, Limited, of Kent Brewery, Sydney, New South Wales, made the following observations on malting barley:—

"The question of harvesting we consider one of the most important features in barley growing, and always stress upon the farmer the need for particular care when performing this operation.

It is in harvesting that most judgment and care are requisite with a malting-barley sample, and an otherwise good yield of grain may be spoilt through carelessness and inattention at almost any stage before the barley is safely in the malthouse. The malster much prefers to have barley which is cut, dried in the field, and stacked for from six to eight weeks before it is threshed. In the stacks barley becomes more matured and mellowed in quality, and therefore makes much better malt, and this particular effect can only be obtained by the process mentioned. Hard, flinty grain is most undesirable, and barley which has been stacked is far less likely to be objectionable in this respect than that which has been harvested by a stripper-harvester. The fact that strippers are almost the only machines in use in certain districts has been somewhat of a drawback to farmers. Nevertheless, it is quite possible to obtain good results with barley harvested by stripper, and during 1909 and 1910 some excellent samples were taken off by this means by farmers who otherwise could not have grown the crop, owing to the absence of threshing plants in the district. The stripping requires to be carefully done, and by experienced hands. The machine must not be driven too fast, and the beaters should be set well off the concave, so that the grain is not threshed too closely. The fact cannot be too much impressed upon the farmer that barley which has been bruised, nipped off at the ends, or broken, is absolutely useless for malting, as it will not germinate.

When to Harvest Malting Barley.

Whatever the method employed, barley should be ripe, but not overripe, when harvested. Nothing is gained by harvesting barley dead ripe, for it is not then improved in quality, and a large proportion will be shed before it reaches the stack. It is better to commence stripping or cutting just before it becomes thoroughly ripe, and it should be got off as speedily as possible, so that the grain may be as nearly as possible of uniform ripeness. If cut, five or seven days at the extreme should cover the operation.

It is worthy of special note by growers that barley is fit for harvesting long before wheat or oats.

Stacking Barley.

When harvested by reaper and binder, the barley must be placed in stooks, to avoid staining by the sheaves lying on the ground, and so remain until thoroughly dry. It should then be stacked for from six to eight weeks. The stacks must be effectively thatched, or otherwise protected from the weather, as barley cannot be stacked to resist the weather without protection, for the straw will not turn water like wheat straw, and a little rain on it in the stacks is bound to do harm by discoloring the grain. Large stacks are preferable, as there is less exposed, and the mellowing effect on the grain is more thorough. If it is not thoroughly dry before being stacked it will probably heat in the stack and be rendered useless for malting. Care should be taken in the event of there being any discolored sheaves, not to include them with the sound sheaves. It is much better to place the former on one side for use as feed, rather than run the risk of spoiling a first class sample, and so decreasing the value of the whole of the barley.

In many instances farmers find half of their grain crops ready to harvest and the other half in a green stage, but as the result on the malster's 'floor' is the same as when the grain is sown, it is of great importance that, as far as possible, the barley harvested should be of even ripeness or maturity. It is not possible to make first class malt from barley which does not germinate evenly. This evenness of maturity can be attained with barley which has been harvested with a binder, by turning the sheaves after they have stood in the stooks for about three days—the inner portions of the sheaves should be turned to the outside, and sheaves forming the southern halves of the stooks should be brought round to the north, so that the sun may reach all, and the barley be properly matured. All barley crops cut should be treated in this manner to obtain best results for a good malting sample.

Threshing Malting Barley.

A first class sample of barley may be rendered valueless for malting by being injured in threshing, consequently this work should be in the hands of experienced men, and every care and constant supervision exercised. Complaints are frequently made by brewers and malsters of the injury done to barley in the process of threshing, owing to the fact that the drum of the threshing machine is set so close that many of the grains are cracked or broken. The presence of such injured grains greatly reduces the value of the barley for malting purposes, as the broken, bruised, or skinned grains fail to germinate, and soon show signs of mould, thus leading to unsoundness in the malt, and bad results in the brewery. The injury caused by overdressing is not limited to grains which are actually broken; grains closely nipped at one or both ends, or such as have been bruised or peeled are equally objectionable. In fact, if by too vigorous threshing the husk of the barley is damaged, although the damage may not be apparent, the irregularities in the malting, accompanied by the production of mould, are likely to result.

The concave of the machine must not be set too close to the drum, and the revolution of the drum should be at least 200 less than the number required for threshing wheat.

When farmers commence a day's threshing, they should at the outset, and repeatedly during the day carefully examine the grain, and if any signs of injury are observed, the concave of the drum of the machine should be slightly opened. It is better that part of the beard should be left adhering to the grain than that any risk should be run of injuring the reputation and value of home-grown barley on account of broken and chipped grains.

A new machine will break the grain more than a machine which has been used for a time, and in which the roughness of the beaters has been worn off. On the other hand, when a machine has been much worn, the centre of the drum and concave, having had the most work in consequence of the feeding being necessarily more in the centre than at the ends of the drum, will have a greater space than at the two ends, and if the centre threshes clean, the ends will be too close and damage to the grains will occur This fault can only be remedied by putting on new drum beaters and concave ribs.

Great attention should also be paid to regularity of feeding. The thresher should be driven at an even speed, and proper care should be taken over the adjustment of the several parts of the machine. It is not only in the drum of the machine that unnecessary damage to the kernel takes place, but also in the barley awner or hummeler, through which the grain subsequently passes Here, if the beaters are set too closely, and the barley is roughly handled, 'nibbing' will take place.

Different varieties of barley require different treatment, so that those in charge of the threshing should make a point of closely examining the sample, and if this is injured in any way, of ascertaining in what part of the machine the injury occurs, altering the setting until it is remedied.

As a further guide in threshing, it may be added that on no account should the barley be rushed through the machine, as it is better to be content with a moderate output and a more perfectly threshed sample. It is important that the machine should be thoroughly clean in all parts before commencing the day's threshing.

The screen should be open and seconds and thirds taken out, for the more even the sample the better the price the barley will bring. If the barley is smutty do not put it through the 'polisher,' but through the 'screw,' for then the smut balls or bladders will not be broken, and the grain discolored. If the seed has been properly pickled before sowing, there should be no smut whatever.

It is worthy of note that straw from barley is about equal to that from wheat, for feed purposes."

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FIRST REPORT ON APPLE GROWING AT KYBYBOLITE EXPERIMENTAL FARM.

[By L. J. Cook, Manager]

During the year 1908 orchard land at Kybybolite Experimental Farm was prepared and planted; about 10 acres with apples, mainly with the view of testing apple growing commercially in the district. Also, about an acre of varieties of mixed stone and pip fruits and vines were included to supply the homestead with fruit, and to demonstrate methods of treatment and attention of trees to agriculturists of the South-East. The orchard is 299 feet above sea level, and the average rainfall for the past 17 years has been 22.43 inches. There is a gradual slope facing the West. The soil is of a free nature overlying a shallow stratum of ironstone gravel, which in turn rests on

a red or yellow clay of a tenacious character. The western end has a surface soil lighter in character than the other parts of the orchard.

During the seasons 1905 and 1906 cereal crops were grown on the area, and in 1907 a grazing crop of rape and mustard was carried. Preparatory to planting, the land was subsoiled to a depth of 15in. to 20in. The great majority of the trees planted consisted of export apples of the three well-known kinds—*Cleopatra, Jonathan,* and *Dunn's Seedling,* and a few rows of *Rokewood, Gravenstein, Ribston Pippin, King of Tompkins County, Scarlet Nonpareil, and Rome Beauty* were included. All the trees were planted 20ft. apart on the septuple system, and the rows of varieties were alternated, so that no two rows of any one variety are adjacent to each other.

The orchard has been surrounded by breakwinds of almonds on the north-west side, *Pinus insignis* on the south-west, and *Cupressus sempervirens* (Cypress) on the north-east, and of these the *Pinus insignis* has made the most effectual breakwind.

Unfortunately, notes on the working of the orchard and handling of the trees during their early life are not at hand, but of late years the trees have thrived comparatively well, and careful records of the produce received, and the work performed during the past five seasons, enables some more or less interesting figures to be tabulated.

Cultural Treatment.

The orchard is ploughed once or twice a year, and cultivated regularly throughout the spring and summer months, so as to conserve as much as possible of the soil moisture for the sole use of the trees and their fruit. The trees are subjected to an annual pruning, sufficient to maintain them in good healthy condition, care being taken to eradicate all signs of "dieback" from which trouble the trees have suffered in the past.

Frequent sprayings have been necessary to keep the codlin moth in check, and also constant attention has had to be given to the woolly aphides, which unfortunately continue to maintain themselves fairly plentifully on the trees. Blackleaf 40 has been sprayed on the trees, and the kerosene swab has been used repeatedly, but although these remedies have kept the aphides in check, they have so far failed to eradicate it. However, we have only had a comparatively low pressure hand pump for applying sprays, but given a high pressure power pump we could apply red oil, as well as the tobacco spray, much more effectively and quickly.

Excepting the spraying outfit, the orchard is fairly well equipped with implements as well as a most serviceable store room for the fruit, with verandahs closed in, to use as a packing shed. A good proportion of our fruit has been sold locally, whilst the bulk of our heavy crops has been graded, packed, and cold stored at the Government Works, Light Square.

The following table shows the total production during the past five seasons, of both windfall and picked fruit received from all varieties of apple trees growing on the main area, outside the small varietal block, and includes all manured as well as unmanured trees:—

Table 1.—Yield of Apple Varieties Kybybolite, Seasons 1918-1923.

Variety.	No. of Trees.	1918-19.		1919-20.		1920-21.		1921-22.		1922-23.		1918-23.	Av. per Tree for 5 Years.	Av. per Tree for 1 Year.
		Total Prod.	Av. per Tree.	Total Prod.	Av. per Tree.	Total Prod.	Av. per Tree.	Total Prod.	Av. per Tree.	Total Prod.	Av. per Tree.	Total Prod.		
		B. L.	lbs.	Bush. lbs.	lbs.	Bush. lbs.	lbs.	Bush. lbs.	lbs.	Bush. lbs.	lbs.	Bush. lbs.	B. L.	lbs.
Cleopatra	400	442 23	44·2	487 20	48·7	328 27	32·8	987 25	98 7	926 21	92·6	3,172 36	7 37	63·4
Gravenstein	21	5 6	9·8	21 9	40·4	18 0	34·3	14 39	28·5	51 22	98·2	110 36	5 11	42·2
Dunn's Seedling ..	168	99 36	23·8	102 15	24 4	110 34	26·4	235 20	56·1	291 1	69 3	839 26	5 0	40 0
Jonathan	417	232 25	22 3	349 29	33 5	142 6	13 6	570 2	54 7	548 28	52 6	1,843 10	4 17	35 4
Rokewood	63	26 15	16·7	58 2	36·9	31 7	19·8	67 5	42 6	63 23	40·4	246 12	3 36	31·3
Ribston Pippin ...	21	4 32	9 1	21 3	40 1	5 22	10·6	9 30	18·6	30 16	57·9	71 23	3 16	27 3
Rome Beauty	20	15 24	31 2	18 16	36·8	6 32	13·6	11 28	23·4	13 39	27·9	66 19	3 13	26·6
King of Tompkins County	21	1 25	3·1	6 34	13 0	2 18	4·7	25 11	48·1	29 18	56·1	65 26	3 5	25·0
Scarlet Nonpareil .	21	2 36	5 5	19 30	37·6	0 37	1·8	19 6	36·5	22 26	43·1	65 15	3 4	24·9
Totals	1,152	831 22	28·9	1,084 38	37·7	646 23	22·5	1,941 6	67·4	1,977 34	68·7	6,482 3	5 25	45·0

From the above table we notice that the last two seasons have been productive years, returning the general average yield over the whole

1,152 trees, of nearly 1¾ cases per tree. 1918 and 1920 were comparatively poor seasons, whilst 1919 was a little below average. The Cleopatra variety stands out as the most prolific bearer, being the heaviest yielder in three out of five seasons under consideration, and Gravenstein holds the pride of position in the other two seasons. The fact that the yearly average of Cleopatras has been half a case above any other variety, and also that over one-third of the orchard consists of this variety, has kept the average per tree of the whole orchard as high as 45lbs. per tree, which is above the average production of any other variety. It must be remembered that the Cleopatras are not in a block on the orchard, but that over half of the area there is a row of Jonathans on both sides of each row of Cleopatras, and over the other half there is a row of Jonathans on one side, and Dunn's Seedling on the other.

In estimating the value of the above variety yields, consideration has had to be given to the windfalls, and table 2 shows the total windfalls from each variety for the five seasons, together with the percentage picked in comparison with the percentage of windfalls. It is to be noted that most bird picked and moth infested fruits have been included amongst the windfalls, for when picking all noticeably affected apples are dropped, and weighed with the actual windfalls.

Table 2.—*Percentage of Windfall Apples, Kybybolite,* 1918-1923.

Variety.	No. of Trees.	Total Production for 5 years. Bush.	lbs.	Total Windfalls for 5 years. Bush.	lbs.	Per Cent. of Sound Fruit.	Per Cent. of Windfalls.
Rokewood	63	246	12	20	21	91.7	8.3
Scarlet Nonpareil	21	65	15	10	22	83.8	16.2
Rome Beauty	20	66	19	13	24	79.5	20.5
Jonathan	417	1,843	10	571	12	69.0	31.0
Ribston Pippin	21	71	23	22	29	68.3	31.7
King of Tompkins County	21	65	26	22	9	66.1	33.9
Cleopatra	400	3,172	36	1,107	7	65.1	34.9
Dunn's Seedling	168	839	26	366	36	56.3	43.7
Gravenstein	21	110	36	55	11	50.2	49.8
Totals	1,152	6,482	3	2,190	11	66.2	33.8

The above table shows that we have had considerable loss through the ravages of wind and birds, especially from the two varieties Gravenstein and Dunn's Seedling. In estimating value of production, 1s. per case has been allowed for the above windfalls, because if they fall on loosely cultivated soil, and are gathered soon after falling, they certainly have some commercial value when sold for immediate consumption. Moveover, they have a value as pig food.

The following list contains the actual average net prices of sound and reject apples sold from the orchard each year after deducting all costs of cases, packing, and storage, except the labor of picking and grading:—

Season.	Per Case. s.	d.
1918-19	5	6·27
1919-20	4	11·79
1920-21	5	7·47
1921-22	4	10·42
1922-23	4	7·77
Average for five years	5	1½

Table 3.—Value of Fruit from Apple Varieties, Kybybolite, Seasons 1918-1923.

Variety.	No. of Trees.	Total Apples Picked.	Price.	Value of Picked Apples.	Total Windfall Apples.	Price	Value of Windfalls.	Total Value of Fruit.	Average Annual Value of Fruit.	Average Annual Value per Tree.	Average Annual Value per Acre of 125 Trees.
		Bush. lbs.	s. d.	£ s. d.	Bush. lbs.	s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	£ s. d.
Cleopatra	400	2,065 29	5 1½	529 6 10	1,107 7	1 0	55 7 2	584 14 0	116 18 10	5 10.1	36 10 2
Rokewood	63	225 31	"	57 17 1	20 21	"	1 0 6	58 17 7	11 15 6	3 8·8	23 6 8
Jonathan	417	1,271 38	"	325 18 9	571 12	"	28 11 3	354 10 0	70 18 0	3 4·8	21 5 0
Dunn's Seedling	168	472 30	"	121 2 10	366 36	"	18 6 11	139 9 9	27 17 11	3 3·85	20 15 1
Gravenstein	21	55 25	"	14 5 1	55 11	"	2 15 3	17 0 4	3 8 1	3 2 9	20 5 2
Rome Beauty	20	52 35	"	13 11 0	13 24	"	0 13 7	14 4 7	2 16 11	2 10·1	17 15 2
Scarlet Nonpareil ...	21	54 33	"	14 1 0	10 22	"	0 10 7	14 11 7	2 18 4	2 9·3	17 6 10
Ribston Pippin	21	48 34	"	12 10 4	22 29	"	1 2 9	13 13 1	2 14 7	2 7·2	16 5 0
King of Tompkins County	21	43 17	"	11 2 7	22 9	"	1 2 3	12 4 10	2 9 0	2 4	14 11 8
Total all varieties.	1,152	4,291 32	5 1½	£1,099 15 6	2,190 11	1 0	£109 10 3	£1,209 5 9	£241 17 2	4 2·4	£26 5 0

The above table shows the total value of produce received from each variety, and from it has been computed the annual value per tree and the value per acre of 125 trees. In value as well as in production the Cleopatra variety stands out above the others, but the Rokewood and Jonathan varieties have exceeded the Dunn's Seedling and Gravenstein.

The general average return of 4s. 2.4d. per tree for a production of 45lbs. of fruit as shown in Table 1, shows the general average value of apples for the five years at 3s. 9d. per case.

Manuring of Apple Trees.

During 1914 a test of manuring for the three varieties of export apples, *Jonathan, Cleopatra,* and *Dunn's Seedling* was commenced. The mineral fertilisers, viz.:—Lime, superphosphate, potassium sulphate, and ammonium sulphate have been applied to various of each variety in both light and heavy dressings, and in such a way as to test each class of manure separately, and with the others. Also, the organic farmyard manure and green manuring have been tried both with and without lime. Unfortunately, the manures have not been applied regularly every year, but they were applied in 1914, 1915, 1918, 1919, 1920, and 1922. Altogether six applications have been given, and Table 4 shows the class and quantity of manuring, with the average annual produce received during the past five seasons from all trees so manured. The value per acre and per tree has been computed from the general average value of 3s. 9d. per case, secured during the past five seasons. By subtracting the value or fruit received from the no manured trees, and also the value of manure applied, the actual profit per acre due to manuring is shown.

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Table 4.—Results of Manuring Apple Trees, Kybybolite, Seasons 1918-23.

Variety of Manure and Quantity Applied per tree at each application.	No. of Trees.	Average Annual Yield Per Tree.	Price Per Case.	Annual Value Per Tree.	Annual Value Per Acre of 125 Trees.	Increase per Acre Due to Manure.	Cost of Manure.	Profit Per Acre Due to Manure.
		Lbs.	s. d.	s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
3lbs. super. & 10lbs. lime	46	62·8	3 9	5 10 65	36 15 11	16 2 3	2 10 3	13 12 0
3lbs. super. & 1½lbs. pot. sul.	37	62·1	"	5 9·86	36 7 8	15 14 0	2 13 9	13 0 3
3lbs. super. & 1lb. amm. sul.	28	61·3	"	5 8·96	35 18 4	15 4 8	2 5 9	12 18 11
3lbs. super., 1lb. amm. sul. & 1½lbs. pot. sul.	35	61·4	"	5 9·07	35 19 6	15 5 10	4 2 9	11 3 1
1cwt. farmyard manure.	11	55·4	"	5 2·32	32 9 2	11 15 6	3 2 6	8 13 0
10lbs. lime	42	52·4	"	4 10·95	30 14 1	10 0 5	1 13 6	8 6 11
3lbs. super., 1lb. amm. sul., 1½lbs. pot. sul., and 10lbs. lime	33	59·5	"	5 6·94	34 17 3	14 3 7	5 16 3	8 7 4
1lb. super., ½lb. amm. sul.	63	48·1	"	4 6·11	28 3 8	7 10 0	0 12 10	6 17 2
1lb. super.	126	46·2	"	4 3·97	27 1 4	6 7 8	0 5 7	6 2 1
3lbs. super.	42	46·4	"	4 4·2	27 3 9	6 10 1	0 16 9	5 13 4
1½lbs. pot. sul. & 1lb. amm. sul.	31	49·5	"	4 7·69	29 0 1	8 6 5	3 6 0	5 0 5
1lb. super., ½lb. pot. sul.	63	44·3	"	4 1·84	25 19 2	5 5 6	0 11 9	4 13 9
Green manure every two years	42	43·6	"	4 1·05	25 10 11	4 17 3	0 7 6	4 9 9
Green manure and 10lbs. lime every two years	32	44·7	"	4 2·29	26 3 10	5 10 2	1 4 3	4 5 11
1lb. super., ½lb. pot. sul., and ½lb. amm. sul.	63	41·2	"	3 10·35	24 2 10	3 9 2	0 19 0	2 10 2
½lb. pot. sul. & ½lb amm. sul.	63	39·4	"	3 8·32	23 1 8	2 8 0	0 13 5	1 14 7
1cwt. farmyard manure and 10lbs. lime	18	45·5	"	4 3·19	26 13 3	5 19 7	4 16 0	1 3 7
No manure	126	35·3	"	3 3 71	20 13 8	—	—	—

The value of manures allowed in above table have been as follows:—Superphosphate, £5 per ton.; ammonium sulphate, 26s. per cwt.; potassium sulphate, 22s. per cwt.; agricultural lime (air slacked), £3 per ton; farmyard manure, 10s. per ton; green manure (peas), 15s. per acre every two years.

From Table 4 it is apparent that good repayment can be secured for money outlaid on fertilisers, and it is not surprising that the two fertilisers, lime and superphosphate, should be at the top of the list. These two have proved themselves beneficial to general crop production in the district, and it is probably natural that they should prove most beneficial in the orchard. There is not a great deal of difference in the general growth and appearance of the trees under the different manurings, but the better manured rows have the better and healthier appearance. One point is particularly noticeable, the weed sorrel gives us considerable work and trouble to keep under, and where lime has been applied this work and trouble has been very much lessened. It is apparent that potassic and nitrogenous manures are beneficial,

but without the addition of phosphatic fertiliser the profit that they produce is very small. Lime apparently unlocks the potash and nitrates already in the soil, and is the cheaper to apply.

Cold Storage of Apples.

During 1922, 433 cases of apples were stored at the Light Square Cold Stores, and sold during the year on the Adelaide market. As the charges, and costs of this method of disposing of apples may prove of interest to some growers, I am including herewith a general resume of the various charges incurred, and prices received by us for these apples. The following—209 cases, Jonathan; 177 cases, Cleopatra; 29 cases, Dunn's Seedling; and 18 cases, Rokewood were sent to the stores during April and May. The bulk of the apples, 378 cases of Jonathan and Cleopatras, was sold out about the middle of July at 10s. and 9s. per case respectively. The Dunn's Seedlings were sold about mid-September at 10s., and during November the balance of Jonathan was sold at 10s., and the Rokewoods at 7s. 7d. per case. The whole 433 cases realised the gross return of £204 17s. 8d., or 9s. 5½d. per case. Against this the following charges were credited:—

	£	s.	d.		s.	d.	
Storage	30	1	10	or	1	4.67	per case
Railage—Kybybolite-Mile End	15	3	0	„		8.4	„
Cartage—Rail to Stores and Stores to Clients	3	1	0	„		1.68	„
Commission	10	5	7	„		3.5	„
Wrapping Paper, Nails, &c.	6	6	4	„		3.5	„
Cases (new soft wood)	27	10	3	„	1	3.25	„
Total,	£92	8	0	„	4	3.2	

These charges include all except the labour of picking, packing, and grading at the Farm, and leaves us a net return of £112 9s. 8d., or 5s. 2.3d. per case. The charges for storage of the individual varieties were approximately as follows:—Jonathan, 1s. 7½d. per case; Cleopatra, 1s. 1d. per case; Dunn's Seedling, 1s. 3d. per case; Rokewood, 1s. 10d. per case. Comparing these with the prices secured for the different varieties, we find that we received approximately the following net returns:—Jonathan, 5s. 6d. per case; Cleopatra, 5s. per case; Dunn's Seedling, 5s. 10d. per case; Rokewood, 2s. 10d. per case. These prices were secured for portion of our sales during one year only. In future possibly we shall be able always to sell the varieties separately, so that an idea of the selling price of each particular variety can be secured.

In closing this report, I particularly wish to mention the work of our orchardist, Mr. S. C. Billinghurst, who has been very painstaking with the work of the orchard, and has helped considerably in recording and compiling the above figures.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.—DISTRICT CONFERENCES.

The last of the District Conferences of the Agricultural Bureau of South Australia for the year 1923 was held at Veitch during October. This was preceded by gatherings at Minnipa during September, and at Balhannah during October. In all, 12 Conferences were held during the year, and an outstanding feature was the keen interest taken in these gatherings. This was evidenced not only by the attendances of delegates, which, with one exception, were particularly large, but also by the tenor of the discussions, and questions on matters of agricultural interest.

CENTRAL EYRE PENINSULA BRANCHES.

The fifth Annual Conference of Central Eyre Peninsula Branches was held at the Government Experimental Farm, Minnipa, on September 27th and 28th. Some 300 delegates representing all parts of the Peninsula attended. The first day was devoted to a consideration of papers and questions submitted by Branch members. During the morning of the second day, delegates made a tour of inspection of the farm under the direction of Departmental Officers, the remainder of the day being devoted to Conference business. Captain S. A. White, C.M.B.O.U. (Vice-Chairman of the Advisory Board of Agriculture), delivered the opening address, and the Director of Agriculture (Professor A. J. Perkins) joined in welcoming delegates and visitors to the Farm. Papers, "How can country life be made more attractive to young people?" by Mr. E. J. Barraud (Lipson Branch), and "Sheep selection for the Farmer," by Mr. L. Pearce (McLachlan Branch), were read. A large list of questions previously submitted by Branches was replied to by the visiting Officers of the Department, which included the Director of Agriculture (Professor A. J. Perkins), the Superintendent of Experimental Works (Mr. W. J. Spafford), the Government Dairy Expert (Mr. P. H. Suter), Assistant Government Veterinary Surgeon (Mr. R. H. F. MacIndoe, B.V.Sc., M.R.C.V.S.), and the Secretary, Advisory Board of Agriculture (Mr. H. J. Finnis). Captain S. A. White, during the last session of the Conference, delivered an address illustrated with lantern views, "Across Australia by Motor." The following resolutions were carried:—"That in the opinion of this Conference it is desirable that greater activity be shown by the Government in the Wool Industry, by appointing additional instructors in wool and wool classing"; "That the minimum age of members attending the Winter School at Roseworthy Agricultural College should be reduced from 21 to 18 years"; "That we guarantee to pay a nominal fee for the services of a Veterinary Surgeon, provided one is stationed on Eyre

Peninsula"; "That the Railways Department be asked to place railway facilities at the disposal of the Branches to the north and north-west of the Conference Centre"; "That this Conference protests against the freights and fares charged by the Adelaide Steamship Company"; "That an instructor in fruit growing and gardening be appointed for Eyre Peninsula, or that a Horticultural Officer visit the Peninsula from time to time, providing sufficient inducement offers"; "That this Conference re-affirms the resolution carried at the 1922 gathering, 'That owing to the urgent need for water, this Conference urges that a pumping station be placed at Polda, and water pumped from there to the railway station' "; "That there be a Farmers' School at the Minnipa Experimental Farm, immediately prior to the Annual Conference, to be run on the same lines as the Winter School at Roseworthy Agricultural College, as soon as circumstances permit." It was decided that the 1924 Conference should be held at Minnipa during the last week of September.

HILLS BRANCHES.

Representatives of the Lenswood and Forest Range, Meadows, Morphett Vale, Uraidla and Summertown, Iron Bank, Longwood, Blackwood, Cherry Gardens, Clarendon, and Balhannah Branches attended the Annual Conference of Hills District Branches at Balhannah on the 11th October. Mr. H. N. Wicks presided, and was supported on the platform by Captain S. A. White, C.M.B.O.U. (Vice-Chairman of the Advisory Board of Agriculture), the Director of Agriculture (Professor A. J. Perkins), the Horticultural Instructor (Mr. George Quinn), the Poultry Expert (Mr. D. F. Laurie), Mr. H. Wicks (Member of the Advisory Board of Agriculture), and the Secretary, Advisory Board of Agriculture (Mr. H. J. Finnis). After the opening address, delivered by Captain S. A. White, the following papers were read:—"The Bureau Member on the Farm," Mr. L. C. Spencer (Clarendon); "Potato Culture," Mr. George Prentice (Uraidla and Summertown); "Better Utilization of Land in the Southern District," Mr. A. H. Furniss (Morphett Vale); "Milk and its Products," Mr. A. Bohme (Balhannah); "Phylloxera," Mr. H. Wilson (Morphett Vale); "Onion Growing," Mr. W. Rollbusch (Balhannah). Resolutions as follows were carried by the Conference:—"That more space in the *Journal of Agriculture* be allotted to mixed farming and fruit growing"; "That the Government take more drastic action in enforcing the Fruit Diseases Act, and prevent the sale of codlin moth infected fruit elsewhere than to a factory"; "That copies of the report of the investigations recently carried out in relation to the refrigeration of fresh fruit be obtained and forwarded to all Branches of the Agricultural Bureau interested in the export of apples." The evening session was in the hands of Captain S. A. White, who delivered an illustrated lantern lecture, "Across Australia by Motor." It was decided that the 1924 gathering should be held at Meadows.

MURRAY MALLEE LANDS DISTRICT CONFERENCE.

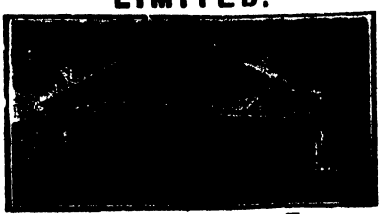
A Conference of representatives of Branches situated in the Murray Mallee Lands was arranged to be held at the Government Experimental Farm, Veitch, on October 23rd and 24th. Unfortunately, from the point of view of attendance, farmers were busy with the hay harvest which had already commenced in many parts of the district. The opening address was delivered by the Director of Agriculture (Professor Arthur J. Perkins). Papers were contributed by Messrs. S. Willison (Alawoona), "The Farm Orchard and Vegetable Garden," and E. L. Cowled (Borrika), "Advisability of Good Fellowship and Sociability amongst the Farming Community." Under the guidance of the Officers of the Department, the cropping on the farm was inspected. The representatives of the Department present, namely, the Director of Agriculture (Professor Arthur J. Perkins), the Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S.), the Superintendent of Experimental Work (Mr. W. J. Spafford), the Assistant Government Veterinary Surgeon (Mr. R. H. F. MacIndoe, B.V.Sc., M.R.C.V.S.), the Manager of the Experimental Farm, Veitch (Mr. L. Smith), and the Secretary, Advisory Board of Agriculture (Mr. H. J. Finnis), replied to numerous questions. Resolutions were carried requesting the Department of Agriculture to compile and publish a list of "red" varieties of wheat, and of "white" varieties which were likely to prove efficient substitutes for same; and also urging that railway and telephone rates be reduced. It was decided that the next gathering should be held at Veitch during the first week in October, 1924.

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ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Tuesday, October 9th, 1923, there being present Capt. S. A. White (Vice-Chairman), Professor Arthur J. Perkins (Director of Agriculture), Col. Rowell, Messrs. C. J. Tuckwell, H. Wicks, W. J. Colebatch (B.Sc. (Agric.), M.R.C.V.S.), J. W. Sandford. Apologies were received from the Hon. G. F. Jenkins, M.P. (Minister of Agriculture), and Mr. W. S. Kelly.

Stock Diseases Act.—At the recent Conference of Southern Branches a resolution was carried asking that the provisions of the Stock Diseases Act should be rigidly enforced. The Chief Inspector of Stock (Mr. C. A. Loxton, B.V.Sc.), to whom the matter was referred, stated that all breaches of the Stock Diseases Act which came under the notice of the Department were dealt with. The District Inspector at Murray Bridge had been instructed to see that the provisions of the Stock Diseases Act (Compulsory Dipping) were observed. All reports of travelling stock affected with lice or tick would be investigated.

Cotton Cultivation.—The 1923 Conference of River Murray Branches of the Agricultural Bureau resolved that the Government be requested to undertake diversified experiments in the cultivation of cotton in the Murray Valley. The matter was forwarded to the Minister of Agriculture, who intimated that at the present juncture he did not feel justified in asking the Government to authorise any considerable expenditure in the direction indicated. Experiments were being carried out by private individuals, and also by the Cotton Association, and these should give results in the course of a year or two which would enable the Minister to decide what further expenditure was desirable.

Woolly Aphis.—The Blackwood Branch requested that experiments might be conducted at the Blackwood Orchard to ascertain whether crude salt dug into the soil around the tree would eradicate woolly aphis on apple trees. In the course of a report on the subject, the Horticultural Instructor (Mr. Geo. Quinn) stated that if suitable trees affected with woolly aphis could be located he proposed to try the salt dressing during the coming season in an empirical manner. The Secretary was instructed to forward a copy of Mr. Quinn's report to the Blackwood Branch.

Resolutions carried at the 1923 Congress.—(1) "That Branch members over age travelling to the Winter School at Roseworthy Agricultural College should be granted railway tickets at excursion rates." It was decided to refer the resolution to the Minister of Agriculture, suggesting that persons travelling to the Winter School should be entitled to railway tickets at excursion rates, irrespective of age. (2) "That the Education Department be asked to alter the date of the Michaelmas holidays to synchronise with Show week, so that

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country children might have an opportunity of attending the Show." It was decided to transmit the matter to the Minister of Education, seeking an expression of opinion from that Department. (3) "That action be taken to prevent the destruction of timber on all roads of the State." The Secretary was instructed to forward the resolution to the Minister with the strong support of the Board. (4) "That the Government be urged to evolve some scheme for planting trees on stock reserves." It was decided to ask for a report from the Woods and Forests Department on the possibility of the proposal. (5) "That the plant known as "horehound" be proclaimed a noxious weed." It was decided to ask the Professor of Botany to report on the recommendation. (6) "That the Government be asked to enforce the regulations dealing with the compulsory spraying of orchards." The Board decided that the matter should be forwarded to the Minister supporting its previous recommendation. (7) "That this Conference is of opinion wheat sacks should be of uniform size." The Secretary was instructed to ask the Marama Branch to supply any information they had as to variation in the size of sacks. (8) "That the Goverment be asked to expedite the allotment of dry blocks in irrigation areas to overcome the shortage of wood supplies for settlers' use." It was decided to forward the resolution to the Minister of Agriculture requesting transmission to the Irrigation Commission. (9) "That instead of one-third of the members who are lowest in attendance at the meetings of the Branch being struck off the roll, only members who have failed to attend a certain percentage, say, 75 per cent. of the meetings be struck off at the annual revision of the rolls." The Board decided to adopt the suggestion of Congress. (10) "That the Government be asked to fix a standard for all spraying compounds, and that manufacturers be required to conform to same." The Secretary was instructed to obtain a report on the matter from the Horticultural Instructor (Mr. Geo. Quinn).

It was decided to transmit the following resolutions to the Minister of Agriculture for his information:—(*a*) "That it is desirable that legislation to provide for the compulsory registration of stallions be introduced." (*b*) "That the position of Mallee Lands Instructor be filled." (*c*) "That in the opinion of Congress, the Fertilizers Act should be amended in such manner as to require guarantees to indicate the phosphoric acid content instead of the tricalcic phosphate."

The following resolutions were received:—(*a*) "That the Government be asked to appoint one or more Wool Instructors to be attached to the Department of Agriculture." (*b*) "That this Congress supports the Chamber of Commerce in its recent recommendation that the Chapman sack filled with grain be accepted by the handling agents regardless of weight." (*c*) "This Congress protests against the action of the Adelaide Steamship Company in raising the freights and fares on the vessels trading between Spencer Gulf Ports." (*d*) "That this Congress impress on the Government the necessity for destroying noxious weeds on railway lines and Crown lands in the whole of the

State." (*e*) "That dried fruit be carried on the railways at the same rate as fresh fruit." (*f*) "That all motor cars and motor vehicles be registered in the district council in which the owners reside, and that the money be retained by the council for the repair of roads in the same district."

Resolutions from Eyre Peninsula Conference.—(1) "That the minimum age of members attending the Winter School at Roseworthy Agricultural College should be reduced from 21 to 18 years." The Board expressed the opinion that it was not desirable that any alteration in the age should be made. (2) "This Conference re-affirms the resolution carried at the 1922 Minnipa Conference, "That owing to the urgent need for water, this Conference urges that a pumping station be placed at Polda, and water pumped from there to the railway station.'" It was decided to forward the resolution to the Minister of Agriculture for transmission to the Commissioner of Public Works. (3) "That this Conference resolves that the Railway Department be approached asking that railway facilities to be placed at the disposal of the Branches to the north and north-west of the Conference centre." The Board decided that the matter should be deferred until arrangements were being made for the preparation of the 1924 Conference agenda. (4) "That the Government be asked to station a veterinary surgeon on Eyre Peninsula, and that it be assured that the Conference, in making this request, agrees to the principle of payment by stock-owners for services rendered by such officers." It was decided to bring the resolution under the notice of the Minister of Agriculture.

The following resolutions were received:—(1) "That this Conference protests against the freights and fares charged by the Adelaide Steamship Company." (2) "That an instructor in fruit growing and gardening be appointed for Eyre Peninsula, or that a Horticultural Officer shall be sent over from the Department of Agriculture from time to time, providing sufficient inducement offers." (3) "That there be a Farmers' School at the Minnipa Experimental Farm immediately prior to the Annual Conference to be run on the same lines as the Winter School at Roseworthy Agricultural College, as soon as circumstances permit." (4) "That in the opinion of this Conference it is desirable that greater activity be shown by the Government in the wool industry by appointing additional instructors in wool and wool classing."

Water Conservation Act.—The following resolution was received from the Smoky Bay Branch:—"That the Water Conservation Act Further Amendment Bill be protested against in relation to the taxing of lessees within a six-mile radius of Government tanks." The Board was of the opinion that this matter was one outside its scope, and instructed the Secretary to suggest to the Smoky Bay Branch that it should bring the resolution under the notice of the Members for the District.

Crop Reports.—Correspondence was received from the State Meteorologist requesting that a monthly summary of the conditions of the wheat crop in South Australia should be compiled for transmission by

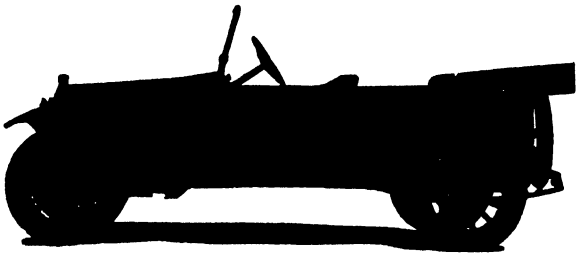
cable to England. The Director of Agriculture (Professor Arthur J. Perkins), in reporting on the matter, considered that the best means of supplying the information desired by Meteorological Department would be to ask Secretaries of the local Branches of the Agricultural Bureau situated in wheat-growing districts to fill in a postcard each month concerning the crop conditions. In addition, departmental officers and farm managers could give information as they were able, according to the areas which they had visited during the course of that month. The Board approved of the recommendation of the Director.

Next Meeting.—It was decided that the next meeting should be held at Roseworthy Agricultural College on Wednesday, November 21st.

New Branches.—Approval was given to the formation of Branches of the Agricultural Bureau at Poochera and Tweedvale, with the following gentlemen as foundation members:—Poochera—G. Gill, E. Brooks, V. Newbon, A. B. and G. B. Bockelberg, B. and S. Sinapins, W. A. Gosling, M. Prowett, S. Jay, F. R., C. H., and H. E. Gosling, A. Millman, A. Gosden, P. Lamphee, N. McCormick, R. Colbert, T. Moore, F. Voumard, P. A. and O. Donenberg, L. Humphries, A. and B. Williams, C. Bohlin.

Branches to be Closed.—It was decided to close the Kingscote and Mount Compass Branches.

New Members.—The following names were added to the rolls of existing Branches:—Windsor—K. Prime; Farrell's Flat—H. P. Monagan; Arthurton—J. T. Nellegan; Mypolonga—H Daenke, H. Smelt, B. Ross, J. Turner, R. Edson, F. Reed, W. Nash, H. Schunke, P. H. Prosser, H. R. Beer; Blackwood—A. L. Warren, E. Place; Waikerie—J. H. Darling, A. Reaby, T. B. Schnider, J. N. Young, E. A. Halliday, C. P. Smith, A. Berndt, G. Searl; McLachlan—S. W. Green, P. Zerke, jun.; Milang—A. Mathews; Booleroo Centre—C. Llewellyn; Gumeracha—L. W. Wise, K. B. Symonds; Willowie—B. Bodell; Borrika—A. J. Amos, A. Hockham, H. C. Dohnt; Balhannah—H. Kerr, T. Drewitt; Allandale East—L. R. Kemp; Morchard—R. J. Hannitt, A. R. Davill; Coomandook—F. E. Ballard, J. Clark, J. Martin, R. Williams; Narrung—B. G. McNicol; Mount Gambier—A. C. Bigham, A. Bigham, J. Glanville, T. Elliott, E. Boardman; Virginia—E. Eckermann; Ramco—R. Piellar, A. Blenkiron; Kangarilla—H. H. Grimwood; Mannanarie—J. Clark, A. R. Bretag, F. Bretag; Mount Barker—E. Martin; Wirrulla—G. McCampbell, C. L. Campbell; Orroroo—F. Goodenough, E. Teague; Coonalpyn—J. H. Gibbs, P. J. Angel; Lameroo—H. P. Kirkwood, A. H. White, C. F. H. Bertram, S. Williams, H. A. V. Steer, J. G. Shearer, G. N. White; Mount Schank—A. A. McFadden, W. Alexander, R. J. Kuby, E. O. Pannell, J. Pudney, A. E. Hennessy, W. Cox, W. Donnan, J. M. Carliss; Kilkerran—J. W. Moody, F. H. Koch; McLaren Flat—R. J. Ward, R. Trott, B. Elliott, F. S. Crawford, C. Robertson, P. A. Wyatt; Maltee—L. Cranwell; Pinnaroo—S. A. Bone; Lone Pine—T. Edwards, O. Heinjus, D. Muir; Light's Pass—E. Polst, P. Spanagel, W. Koop; Shoal Bay—L. M. Chapman, W. R. Chapman, C. Bates.



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Phoenix Motor Coy., Limited,

SOLE AGENTS,

112-120, PIRIE STREET, ADELAIDE.

HUPMOBILE

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., SEPTEMBER, 1923.

IMPORTS.

Interstate.

Apples (bushels)	17,733
Bananas (bushels)	8,116
Oranges (bushels)	14
Passion fruit (bushels)	475
Pineapples (bushels)	1,300
Tomatoes (bushels)	34
Peanuts (packages)	2
Beans (packages)	2
Cabbages (packages)	6
Carrots (packages)	245
Onions (bags)	261
Potatoes (bags)	4,641
Turnips (packages)	16
Turnips, Swede, (packages)	1,636
Bulbs (packages)	26
Plants (packages)	30
Seeds (packages)	65
Trees (packages)	18
Wine casks, empty (number)	3,509

Rejected—1bush. bananas, 3bush. tomatoes, 1 package turnips, 3 packages swedes, and 48 second-hand bags.

Fumigated—1bush. oranges, 6 packages plants, 12 packages trees, and 12 wine casks.

Overseas.

Federal Quarantine Act.

Six thousand and one packages of seeds, etc.

EXPORTS.

Federal Commerce Act.

Fourteen thousand one hundred and eleven packages dried fruit, 668 packages citrus fruits, 2 packages plants, and 3 packages preserved fruit were exported to overseas markets. These were consigned as follows:—

London.

Dried fruit (packages)	11,561
Citrus fruit (packages)	15

South Africa.

Dried fruit (packages)	1,326
Plants (packages)	2

India and East.

Dried fruit (packages)	207
Sauce (packages)	3

New Zealand.

Citrus fruit (packages)	653

Vancouver.

Dried fruit (packages)	500

United States of America.

Dried fruit (packages)	500

Egypt.

Dried fruit (packages)	17

ORCHARD NOTES FOR SOUTHERN DISTRICTS.

[By C. H. BEAUMONT, Instructor and Inspector.]

The main work for the month will be to follow up the spraying operations of last month. Bordeaux Mixture is the material for fungus diseases, and may be used with effectiveness at any time, if it has a good start. For shot hole on plums and cherries it is best used after the trees have unfolded their leaves. It must be continued if a good effect is looked for with "Downy Mildew." Citrus trees affected with "Brown Rot" need special care. See that no foliage is within 18in. of the ground; use a good mulch; spray with Bordeaux. Loosen the soil as soon as possible after irrigation, especially about young trees.

See that you have plenty of cases at hand or on order, and that the fruit picking accessories are ready for use. Sulphuring boxes and drying trays should be put in good order.

Ploughs and harrows should be cleaned and oiled and painted, and put under shelter.

Vines should be cinctured as the caps of the blossoms fall. Deal gently with a weakly vine. Keep soil well worked.

RIVER MURRAY HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR SEPTEMBER, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during Sept.	Per Cow during Sept.	Per Cow October to Sept.	Per Herd during Sept.	Per Cow during Sept.	Per Cow October to Sept.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1/C	32·73	28·31	31605	965·63	9149·09	1253·12	38·29	363·87
1/E	20	14·53	10097	504·85	6731·53	411·89	20·59	295·27
1/J	14·23	11·57	11438	803·79	6434·55	460·31	32·35	289·74
1/L	17·90	17·74	14913·5	833·16	6962·31	634·57	35·45	315·85
1/M	20·52	15·34	10318·5	502·85	5835·33	483·87	23·58	291·15
1/R	16·10	14	10812	671·55	6071·05	486·53	30·22	298·97
1/T	12·73	10·97	7427	583·42	6481·27	381·92	30·00	327·10
1/U	13	11	9135	702·69	7965·67	389·27	29·94	343·15
1/W	19	16·77	11586	609·79	7466·34	448·76	23·62	280·93
1/X	18	12·15	12220	678·88	6578·25	491·30	27·29	287·23
1/Y	24	23·82	16896·5	704·02	7521·71	688·55	28·69	318·72
1/Z	21·81	17·60	15982·5	732·81	6374·08	634·87	29·11	281·55
1/AA*	7	3·22	2861·5	408·79	6998·72	120·82	17·26	312·28
1/BB*	7·33	7·33	3330	454·30	5946 68	164·84	22·49	265·03
1/CC†	19·67	15·88	11123·5	565·51	4749·09	432·17	21·97	201·64
1/V‡	14	13·07	4808	343·43	4302·21	238·64	17·05	194·84
Means	17·38	14·58	11534·69	663·82	7048·68	482·59	27·77	308·16

* Entered Association November 1st, 1922. † Entered Association December 1st, 1922.
‡ Entered Association February 1st, 1923.

MOUNT GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR SEPTEMBER, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during Sept.	Per Cow during Sept.	Per Cow August to Sept.	Per Herd during Sept.	Per Cow during Sept.	Per Cow August to Sept.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
2/A	20·73	12 73	9349	450·99	814·59	337·01	16·26	29·63
2/B	7·4	6·77	6202·5	838·18	1644·13	201·09	27·17	53·75
2/C	18	15·20	9621	534·50	1036·81	347·74	19·32	37·09
2/E	15	9	7455	497·00	912·20	310·96	27·31	44·00
2/F		Withdrawn from Association (31/8/1923)						
2/H	24·33	20·30	14569·5	598·83	1069·98	534·48	21·97	39·20
2/I	12	9·87	7904	658·67	1060·50	289·68	24·14	39·23
2/J	11·70	10·33	9863	842·99	1433·89	373·72	31·94	52·91
2/K	21	16·17	13109	624·24	1030·48	465·72	22·18	37·91
2/L	30	19·03	10394·5	346·48	572·55	430·96	14·37	24·02
2/O	35	26·43	17177	490·77	951·24	662·53	18·93	34·88
2/R	14·89	14·66	15990	1073·88	1961·38	641·08	43·05	77·32
2/S	5	5	3915	783·00	1442·00	174·92	34·98	65·21
2/T	11	9·10	8871	806·45	1477·18	331·26	30·39	57·88
2/U	16	11·83	12415	775·94	1288·63	436·18	27·26	46·24
2/V	16·92	14·93	7102	419·74	746·06	266·03	15·72	30·82
2/W	11·7	11·7	10572	903·59	1809·64	339·99	29·06	59·28
2/X	24	20·07	17363·5	723·48	1226·05	585·12	24·38	42·66
2/Y	11	10·3	9405	855·00	1450·91	367·71	33 43	58·10
2/Z	14·50	14·50	9810	676·55	1347·48	351·00	24·21	51·34
2/Aa	22	20·13	14294·5	649·75	953·84	493·56	22·43	34·78
2/Bb	9	9	4320	480·00	1028·94	154·58	17·18	35·98
2/Cc	12	12	5775	481·25	888·50	224·39	18·70	34·94
Means	16 51	13·59	10248·98	620·86	1109·92	378·31	22·92	41·51

FRIESIAN BULL FOR SALE

The Department of Agriculture has for Sale the Friesian Bull

CHEESEMAN DE KOL 6th.

Born July 15th, 1917, and bred by the executors of the late David Mitchell, Lilydale, Victoria. This bull is by Bolobeck de Kol, from Rosey 20th. The bull is at present at Mount Gambier.

PRICE, 30 GUINEAS.

Further particulars can be had on application to

THE DIRECTOR OF AGRICULTURE.

THE AGRICULTURAL OUTLOOK.

REPORTS FOR THE MONTH OF OCTOBER.

The following reports on the general Agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective Managers:-

Booborowie.—Weather—The weather for October was very cold on the whole, and 230 points of rain were registered. Crops—The crops are very promising, and some very heavy hay and grain yields should be obtained. Natural feed is very plentiful. Stock—The livestock are all in good condition and healthy. Pests—Various noxious weeds are becoming noticeable. Miscellaneous—Farmers are busy cultivating their fallows.

Kybybolite.—Weather has been seasonable for the month. A nice rain fell from the 10th to 12th, followed by two weeks' fine dry conditions. Useful light rains have fallen at the close of the month. Two inches in all have been registered, which is slightly above the average. The total for year is now nearly 23ins., which is considerably above the average. Crops—Autumn-sown crops are mostly poor, and hay crops will yield very light returns. Spring-sown barley and peas are making very good initial growth, and should November be comparatively cool some useful yields of these crops should be received. Fair areas of summer crops have been sown during the latter end of the month. Fields of subterranean clover have made a lot of growth during the month. Natural feed has made good growth, especially during the latter half of the month, and more particularly on those fields that have been top-dressed with phosphatic manure. Stock—Shearing is in hand, but weather has delayed the work a fair amount. The wool clip is lighter than usual.

Turretfield.—Weather—Nice rains have fallen during this month; 147 points were registered. It was much cooler than the average for October. Crops—The crops have improved, and more hay will be cut than was expected, although some of the crops appear to consist of a large proportion of wild oats. The yield on the whole will be very light. Natural feed is plentiful, and holding out well in consequence of the cool weather. Stock are in good condition. A fair number of good-quality lambs are being sent away. Pests—Rabbits are fairly numerous. Miscellaneous—Vineyards are being worked up well, and good growth is being made.

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EXECUTOR TRUSTEE AND AGENCY COMPANY
OF SOUTH AUSTRALIA, LIMITED,
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Established, 1880. Estates and Trust Funds £5,787,834. Write for our Booklet.

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TEMPORARY PREMISES—
11, GRESHAM STREET - - ADELAIDE.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, reported on November 1st, 1923.

BUTTER.—Production during the month showed a substantial increase, and of this a large percentage was sent to cold store for export. Interstate and London buyers have been buying large parcels, which has kept stocks cleared, whilst local purchasers have readily absorbed all available private separators and store and collectors' lines. A lowering in values to the extent of about 1½d. per lb. took place, due to the state of the London market. Choicest factory and creamery fresh butter in bulk, 1s. 4½d.; second-grade bulk, 1s. 2d. to 1s. 2½d.; best separators and dairies, 1s. 3d. to 1s. 3½d.; fair quality, 1s. 1½d. to 1s. 2½d.; store and collectors', 1s. to 1s. 1d.

EGGS.—At each auction held large quantities were marketed, but as a firm demand existed good clearances were effected. Pulp manufacturers and picklers were in evidence at every sale, anxiously purchasing their requirements. Fresh hen, 10d.; duck, 11d. per dozen.

CHEESE.—The seasonable increase brought about bigger quantities being consigned weekly from the South-Eastern factories, but as an exceptionally brisk local demand has been experienced, and fair sales interstate, good clearances have been made, market closing at the end of the month at 11d. to 12½d. per lb. for large to loaf.

HONEY.—Since our last report the demand has improved considerably for all grades, interstate orders being received for large parcels of prime clear extracted in liquid condition at 3½d. to 4d.; best candied lots, 3d. to 3½d.; lower grades, from 2d. to 2½d., according to quality; beeswax readily saleable for clear samples at 1s. 4d. per lb.

ALMONDS.—Steady demand ruled for all classes, big quantities being accepted by local and interstate operators for Brandis at 9½d. to 10d.; mixed softshells, 8½d. to 9d.; hardshells, 4½d. to 5d.; kernels in strong request at 1s. 5½d.; walnuts, 1s.

BACON.—An active trade has been maintained at firm prices, sales of hams increasing as buyers are now purchasing, having in view their stocks for Christmas. Best factory-cured sides, 1s. 3½d.; hams, 1s. 7½d.; Hutton's "Pineapple" brand hams, 1s. 9d.; middles, 1s. 5d.; rolls, 1s. 1½d. to 1s. 2d.; Hutton's "Pineapple" brand lard, in packets, 1s. 1d.; in bulk, 1s.

LIVE POULTRY.—At each sale we submitted fairly large catalogues, which, unfortunately, were short of our buyers' requirements. Therefore, all consignments received were disposed of at most satisfactory prices, and no doubt had the weather been more favorable for forwarding, consignors would have taken advantage of the excellent values which have been secured, and sent along their surplus birds. We anticipate that these good values will continue to rule for some markets to come, as poulterers, restaurant keepers, &c., have only light stocks on hand. Crates obtainable on application. The following prices ruled at to-day's auction:—Prime roosters, 5s. to 7s. 3d. each; nice condition cockerels, 3s. 9d. to 4s. 9d.; poor condition cockerels, 2s. 7d. to 3s. 3d.; plump hens, 4s. 6d. to 6s. 3d.; medium hens, 2s. 11d. to 4s. 3d.; some pens of weedy sorts lower; geese, 6s. 6d. to 7s. 9d.; ducks, good condition, 5s. to 8s. 3d.; ducks, fair condition, 3s. 4d. to 4s. 9d.; turkeys, good to prime condition, 1s. 1d. to 1s. 7d. per lb. live weight; turkeys, fair condition, 10½d. to 1s. 0½d. per lb. live weight; turkeys, fattening sorts lower; pigeons, 10½d. each.

POTATOES.—Only small quantities have been arriving from Victoria, and prices have advanced considerably, and potatoes are now realising 22s. per cwt. on rail, Mile End.

ONIONS.—Best quality dry Victorian onions are realising up to 10s. per cwt. on trucks, Mile End.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month of and to the end of September, 1923, also the average precipitation to the end of Octobber, and the average annual rainfall.

Station.	For Oct., 1923.	To end Oct., 1923.	Av'ge. to end Oct.	Av'ge. Annual Rainfall
Far North and Upper North.				
Oodnadatta	0 13	2 05	4 24	4·93
Marree	0 20	3 70	4 89	6·14
Farina	0 19	3 35	5 56	6·73
Copley	0 21	5 59	7 02	8·50
Beltana	0 16	6·09	7 18	9·65
Blinman	0 40	8 33	10 73	12 61
Tarcoola	0 37	2 86	6 66	7·91
Hookina	0 07	7 86	11 24	13·60
Hawker	0 36	10 86	11 08	12 93
Wilson	0 55	9 75	10 83	12·56
Gordon	0 32	6 78	10 86	11·60
Quorn	1 00	12 00	12 52	14·24
Port Augusta	0 95	6 92	8 41	9·68
Port Augusta West	0 93	6 47	8 50	9·74
Bruce	0 57	6 98	9 14	10·76
Hammond	0 60	10 61	11·30	11 90
Wilmington	1 11	16 34	16·39	18·44
Willowie	1 63	12 14	10 93	12·44
Melrose	3 86	25 94	20 10	23·88
Booleroo Centre	1 46	16 60	13 77	15·67
Port Germein	2 28	12 37	11 20	12 93
Wirrabara	2·11	19 31	17 59	19 85
Appila	1 69	14 78	13 06	15 01
Cradock	0 28	8·57	9·94	11·50
Carrieton	0 68	11 18	11 06	12 91
Johnburg	0 55	8 27	9 16	10·85
Eurelia	1·22	11 68	11 68	13·56
Orroroo	0 76	10 57	11 90	13·75
Nackara	0 26	6 18	10·32	11·85
Black Rock	1 51	13 48	10 92	12·73
Ucolta	0·57	6 75	10·47	12·10
Peterborough	1 20	13 67	11 55	13·53
Yongala	0 72	12 02	12 51	14·51
Lower North-east				
Yunta	—	3·81	7 38	8·93
Waukaringa	0·11	4·80	7·40	8·61
Mannahill	0 03	4 28	7·27	8·79
Cockburn	0·03	4·10	6·98	8·42
Broken Hill, N.S.W.	0·27	6 84	8 46	10·08
Lower North.				
Port Pirie	3 40	12 60	11 97	13·55
Port Broughton	2 15	14 38	11 85	14·27
Bute	2·33	17·09	14 23	15·80
Laura	2·73	19 52	16·23	18·25
Caltowie	1·87	17·36	15·09	17·19
Jamestown	2·35	19·63	15 67	17·86
Bundaleer W. Wks.	1·74	18·35	15·86	18·05
Gladstone	2·36	21·06	14·33	16·22
Crystal Brook	2·19	15·77	14·12	15·93
Georgetown	2·28	20 30	16·49	18·50
Narridy	1·67	14·50	15 61	16·43
Redhill	1 79	15·51	16·31	16·93

Station.	For Oct., 1923.	To end Oct., 1923.	Av'ge. to end Oct	Av'ge. Annual Rainfall
Lower North—*continued*				
Spalding	1·83	14·92	17 78	20·41
Gulnare	1 95	17 81	17 11	19·34
Yacka	1 77	14 65	13·75	15·45
Koolunga	2 03	14 52	14·13	15·87
Snowtown	1 82	14 28	14·40	16·05
Brinkworth	1 97	15 74	14 41	16·26
Blyth	2 04	16 95	15 02	16 96
Clare	2 98	28·22	22 20	24·60
Mintaro	3 24	30 08	21·20	23·40
Watervale	3 51	29 27	24 97	27·44
Auburn	3 60	25 61	21 89	24·30
Hoyleton	2 16	16 52	15 89	17 85
Balaklava	1 85	14 92	14·33	15·91
Port Wakefield	1 30	12 23	11·92	13·29
Terowie	1 15	10 69	11 77	13·78
Yarcowie	0 80	9 89	12 37	14·18
Hallett	1 80	16 00	14·38	16·47
Mount Bryan	2 12	19·79	14 70	16·74
Koonunga	1 98	15 90	16·19	18·06
Farrell's Flat	2 39	20 29	17 03	18 97
West of Murray Range				
Manoora	2 56	22·57	15 76	18·78
Saddleworth	2 54	21 54	17·59	19·74
Marrabel	2 54	26 22	17 64	19·67
Riverton	2 45	26·63	18 59	20 71
Tarlee	2 19	25 61	15 85	17·81
Stockport	2 27	21 01	14 65	16·49
Hamley Bridge	2 17	23 19	14 66	16·52
Kapunda	2·73	24·90	17 76	19·80
Freeling	2 27	23 92	15·91	17·90
Greenock	2 85	29 58	17 31	21·60
Truro	3 01	26·59	18 01	20·80
Stockwell	2 64	26 89	18·01	20·31
Nuriootpa	1 79	24 70	18·69	20·99
Angaston	1 98	27 94	20 05	22·48
Tanunda	1·83	28·65	19 94	22·20
Lyndoch	2·73	37·09	20·62	22·88
Williamstown	2 99	37·56	24 90	27·47
Adelaide Plains.				
Mallala	2·26	22 41	14·51	16·66
Roseworthy	2 07	24 17	15 43	17·29
Gawler	2 71	24 91	17·12	19·09
Two Wells	1·53	20 27	14 17	15 83
Virginia	1 76	23 14	15 30	17·31
Smithfield	2 00	25·89	15 20	17·16
Salisbury	2·68	28·78	14·29	18·45
North Adelaide	2 45	30 30	19 98	22·22
Adelaide	2·22	26·60	18 93	20·05
Glenelg	2 14	23·29	16 57	18·37
Brighton	2 15	25·14	19·61	21·34
Mitcham	2·56	31·90	22 52	24·06
Glen Osmond	2·80	35·52	23 42	25·78
Magill	3 37	37·92	22 68	25·24

RAINFALL—*continued.*

Station.	For Oct., 1923.	To end Oct., 1923.	Av'ge. to end Oct.	Av'ge. Annual Rainfall
Mount Lofty Ranges.				
Teatree Gully.....	2·93	39·36	24·73	27·65
Stirling West	5 00	60 23	42·43	46·59
Uraidla	4·17	58·11	40·29	43·92
Clarendon	3·37	39·56	30·05	32·98
Morphett Vale ...	2·27	26·58	20·58	22·79
Noarlunga	2·14	25·70	19·55	20·35
Willunga	3·15	30·54	23·72	25·89
Aldinga	2·40	23·05	18·66	20·35
Myponga.....	3·26	32·22	26 83	29·16
Normanville	1·90	25·64	20 87	20·61
Yankalilla.....	2·25	29·15	21·24	23·10
Mount Pleasant ..	3·45	38·80	24·83	27·16
Birdwood	3·08	40·12	26·65	29·33
Gumeracha	3·65	48·05	27·55	33·29
Millbrook Reservoir	4·13	49·94	—	—
Tweedvale	4·44	50·04	32·59	35·55
Woodside	3·56	41·70	29·32	32·11
Ambleside.....	4·41	46·44	31·66	34·67
Nairne	2·54	32·45	25·83	28·42
Mount Barker	4·15	42·59	28·48	31 18
Echunga	3·58	43·68	30·14	32·96
Macclesfield	4·23	37·13	27·71	30·57
Meadows	5·05	44·69	32·74	36·04
Strathalbyn	2·31	18 93	17·43	19·32
Murray Flats and Valley.				
Meningie	2·14	21·48	16·83	18·66
Milang	1 29	13·81	15 62	15·40
Langhorne's Creek.	1·86	15·98	12·99	14·61
Wellington	1·15	14·02	13·02	14·77
Tailem Bend	1·47	15·65	12 81	14·55
Murray Bridge ...	1·47	12·78	12·26	13·93
Callington	1·40	16·15	13·80	15·42
Mannum	0·70	9·96	10·36	11·64
Palmer	1·59	16·50	13·74	15·47
Sedan	1·12	13·51	11·02	12·29
Swan Reach	0·71	9·73	9·59	11·09
Blanchetown	0·27	5·05	8·76	10·16
Eudunda.....	1·70	16·65	14·46	17·54
Sutherlands	1·13	11·31	9·65	11·19
Morgan	0·56	6·77	7·86	9·30
Waikerie	0·58	6·89	8·35	9·91
Overland Corner ..	0·41	6·04	9·36	11·07
Loxton	0·44	9·60	10·09	12·63
Renmark	0·72	7·58	10·34	11·09
Monash	—	—	—	—
West of Spencer's Gulf.				
Eucla.....	0·20	4·99	9·23	10·02
White Well.....	0·53	5·04	7·88	9·08
Fowler's Bay	0·54	11·86	11·24	12·16
Penong	0·88	12·64	11·45	12·49
Ceduna.....	0·57	9·56	9·11	10·36
Smoky Bay	0·58	12·88	9·95	—
Petina	0·78	13·61	11·75	13·34
Streaky Bay.....	1·02	14·55	13·98	15·10

Station.	For Oct., 1923.	To end Oct., 1923.	Av'ge. to end Oct.	Av'ge. Annual Rainfall
West of Spencer's Gulf—*continued.*				
Talia	1·10	15·61	13·81	16·45
Port Elliston	1·69	18·71	15·36	16·55
Cummins	1·57	20·09	17·03	18·90
Port Lincoln	1·51	18·68	18·13	19·72
Tumby	1·48	12·23	12·88	14·76
Carrow	1·59	11·65	12·48	14·18
Arno Bay	1·02	11·03	11·68	13·30
Cowell	1·57	7·11	10·55	11·75
Yorke Peninsula.				
Wallaroo	2·07	14·30	12·86	14·18
Kadina	2·14	17·02	14·63	16·05
Moonta	2·26	16 04	13 94	15·38
Green's Plains	2·16	18·37	14·47	18·89
Maitland	2·39	24·83	18·31	20·15
Ardrossan	1·72	16·45	12·83	14·11
Port Victoria	1·72	19·93	13·13	15·47
Curramulka	2·10	20·39	16·63	18·22
Minlaton	2·18	23·06	16·32	17·91
Brentwood	1·74	19·54	14·17	15·83
Stansbury	1·95	21·82	15·43	17·04
Warooka	2·26	25·26	16·41	17·81
Yorketown	1·92	20·93	16·05	17·26
Edithburgh	1·56	20 91	15·02	16·58
South and South-East.				
Cape Borda.....	1·92	24·67	23·28	25·10
Kingscote	1·83	21·36	17·38	19·10
Penneshaw	1·37	16·95	17·26	19·39
Victor Harbor	1·63	20·37	19·49	21·45
Port Elliot	1·33	19·46	19·17	20·26
Goolwa	1·21	15·51	16·07	17·87
Pinnaroo	1·12	16·26	13·53	15·66
Parilla	1·01	15·63	12·61	14·65
Lameroo	1·60	17·37	14·23	16·37
Parrakie	1·55	15·97	12·75	14·54
Geranium	1·76	17·73	14·59	16·19
Peake	1·67	16·55	14·78	16·58
Cooke's Plains ...	1·99	19·63	13·45	15·04
Coomandook	1·78	16·23	15·58	17·48
Coonalpyn	1 46	19·09	15·47	17·42
Tintinara	1·56	20·96	16·45	18·60
Keith.....	1·64	19·50	15·91	18·17
Bordertown	2·38	20·32	17·05	19·44
Wolseley	2·65	22·08	16·19	18·12
Frances	2·67	22·67	17·29	19·78
Naracoorte	2·21	23·60	19·55	22·52
Penola	3·26	26·95	23·38	26·29
Lucindale	2·49	24·39	20·65	22·95
Kingston.....	2·14	23·32	22·71	24·47
Robe	1·70	23·45	22·57	24·59
Beachport.....	1·45	21·83	24·88	20·24
Millicent	3·26	32·01	27·75	29·36
Kalangadoo	4·18	34·99	—	—
Mount Gambier ..	2·68	27·30	27·68	31·24

AGRICULTURAL BUREAU REPORTS.

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Appila-Yarrowie	*	—	—
Arthurton	*	—	—
Ashbourne	‡	—	—
Balaklava	*	10	8
Balhannah	402	23	21
Barmera	393	19	17
Beetaloo Valley	‡	—	—
Belalie North	*	19	17
Berri	393	21	22
Big Swamp	*	—	—
Blackheath	*	23	21
Black Springs	‡	—	—
Blackwood	402	19	17
Block E	‡	—	—
Blyth	382	3	1
Booleroo Centre	382	23	21
Borrika	393	24	—
Brentwood	*	22	20
Brinkley	*	17	22
Bundaleer Springs	382	—	—
Bute	*	20	18
Butler	389	—	—
Calca	*	—	—
Cadell	*	—	—
Canowie Belt	*	—	—
Carrow	383	21	17
Cherry Gardens	402	20	12
Clanfield	*	—	—
Clare	*	—	—
Clarendon	*	19	17
Claypan Bore	*	21	—
Cleve	*	21	19
Collie	*	—	—
Colton	*	30	—
Coomandook	393	21	19
Coonalpyn	390	23	21
Cradock	*	—	—
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Cungena	‡	—	—
Currency Creek	394	23	21
Cygnet River	402	22	20
Darke's Peak	384	14	—
Denial Bay	*	—	—
Edillilie	*	24	—
Elbow Hill	*	27	—
Eurelia	‡	16	—
Farrell's Flat	377	23	21
Frances	§	24	—
Gawler River	*	26	—
Georgetown	*	17	22
Geranium	‡	24	29
Gladstone	‡	23	21
Glencoe West	404	—	—
Glossop	‡	21	19
Goode	‡	21	—
Green Patch	‡	19	17
Gumeracha	*	26	—
Halidon	*	24	—
Hartley	398	21	19
Hawker	*	20	—
Hilltown	*	—	—
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Inman Valley	*	—	—
Ironbank	*	17	22
Kadina	*	—	—
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Kanmantoo	*	17	22
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Ki Ki	*	—	—
Kilkerran	‡	22	20
Kimba	*	—	—
Kingscote	*	—	—
Kingston-on-Murray	*	—	—
Kongorong	‡	19	17
Koonibba	*	23	21
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Lameroo	‡	23	21
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Lone Gum and Monash	*	21	19
Lone Pine	‡	24	22
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Loxton	*	—	—
Lucindale	*	—	—
Lyndoch	*	22	20
McLachlan	386	3	1
McLaren Flat	404	—	—
MacGillivray	402	20	18
Maitland	*	22	20
Mallala	‡	19	17
Maltee	*	23	21
Mangalo	*	—	—
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Marama	393	22	—
Meadows	*	21	19
Meningie	*	—	—
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Mindarie	*	5	3

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Branch.	Report on Page	Dates of Meetings. Nov.	Dec.
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Minnipa	*	21	19
Monarto South	*	—	—
Moonta	383	23	21
Moorak	*	22	20
Moorlands	*	—	—
Moorook	*	22	—
Morchard	373	17	—
Morphett Vale	*	22	20
Mount Barker	‡	21	19
Mount Bryan	*	—	—
Mount Byran East	*	—	—
Mount Compass	*	—	—
Mount Gambier	407	10	8
Mount Hope	386, 389	17	22
Mount Pleasant	404	—	—
Mount Remarkable	‡	—	—
Mount Schank	*	20	—
Mundalla	*	21	19
Murray Bridge	*	20	—
Mypolonga	404	21	19
Myponga	*	—	—
Myrla	*	17	22
Nantawarra	*	22	20
Naracoorte	408	10	8
Narridy	*	24	22
Narrung	*	24	22
Neeta	*	—	—
Nelshaby	‡	17	22
Netherton	‡	—	—
North Booborowie	383	—	—
North Bundaleer	*	—	—
Northfield	*	—	—
Nunkeri and Yutgo	*	4	3
O'Loughlin	*	21	19
Orroroo	‡	24	—
Owen	‡	23	21
Parilla	*	23	—
Parilla Well	393	26	—
Parrakie	*	—	—
Paruna	‡	—	—
Paskeville	‡	23	21
Pata	*	—	—
Penola	408	3	1
Petina	‡	24	22
Pinnaroo	*	1	—
Pompoota	*	14	12
Port Broughton	*	23	21
Port Elliot	‡	21	19
Port Germein	*	24	—
Pygery	‡	21	22
Ramco	389	19	—
Rapid Bay	‡	3	1
Redhill	382	—	—
Rendelsham	‡	21	19
Renmark	‡	22	20
Riverton	*	—	—
Riverton (Women's)	*	—	—
Roberts and Verran	*	22	20
Rockwood	‡	19	17
Rosedale	383	—	—
Rosy Pine	*	—	—
Saddleworth	*	—	—
Saddleworth (Women's)	‡	13	11
Salisbury	‡	6	4
Salt Creek	*	—	—
Sandalwood	*	—	—
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Smoky Bay	389	—	—
Spalding	*	—	—
Stockport	*	—	—
Streaky Bay	*	—	—
Strathalbyn	*	20	18
Talia	388	12	10
Tantanoola	*	17	22
Taplan	*	20	18
Tarcowie	‡	20	—
Tarlee	383	2	—
Tatiara	‡	17	15
Tweedvale	*	—	—
Two Wells	*	—	—
Uraidla & Summertown	*	5	3
Veitch	*	—	—
Virginia	*	—	—
Waikerie	*	—	—
Wall	*	—	—
Wanbi	*	—	—
Warcowie	374	—	—
Watervale	*	—	—
Weavers	*	19	17
Wepowie	374	20	18
Whyte-Yarcowie	*	—	—
Wilkawatt	*	18	22
Williamstown (Women's)	‡	7	5
Williamstown	‡	23	21
Willowie	374	21	19
Wilmington	*	21	19
Windsor	382	—	—
Winkie	*	19	17
Wirrabara	‡	17	22
Wirrega	*	—	—
Wirrilla	*	17	22
Wirrulla	388	17	—
Wolowa	*	—	—
Wookata	‡	17	22
Wudinna	389	17	—
Wynarka	393	—	—
Yabmana	*	—	—
Yacka	*	20	18
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Yaninee	*	—	—
Yeelanna	*	17	22
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* No report received during the month of October. ‡ Held over until next month. ½ Formal.
A.M. Annual meeting.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

HOOKINA (Average annual rainfall, 12in.).

August 30th.—Present: 11 members and seven visitors.

HORSE BREEDING.—Mr. J. O'Connor, who read a paper under the title "Does it Pay to Breed Horses in this District for Use on the Farm," considered that every farmer in that district should breed horses for work on the farm. The farmer with a couple of suitable mares should secure the services of a good draught stallion for the mares, and if the horses that were bred were not required on the farm they could be sold for a good figure at three years of age. The mare in foal should be able to work without any difficulty up to within a week or so of foaling. By breeding two foals every year the farmer would be able to keep a good substantial team of young horses, for it would enable him to dispose of the aged and unsuitable workers. Whilst the horses that were secured from station properties could usually be obtained for a cheap figure, the speaker did not favor them for farm work because they were not easily broken in and did not settle down for a very long time to the work on the farm. In the discussion that followed, Mr. R. Wardleworth agreed with the paper regarding the reliability of the foal reared on the farm, but he considered it was cheaper to buy a horse than to rear one. He held the opinion that a foal would cost about £20 for paddocking before it was ready to be broken in. Other speakers agreed with the writer of the paper.

HOOKINA (Average annual rainfall, 12in.).

September 20th.—Present: 12 members and five visitors.

WOOL CLASSING.—Mr. S. Stone read a short paper, "Wool Classing," and in the discussion that followed Mr. B. A. Murphy expressed the opinion that the best plan to adopt was for the farmer to class the sheep and cull out all the short and coarse woolled animals before they were yarded in the shearing shed. Mr. P. B. Heneschke did not think it advisable for the farmer with a small flock to divide the clip into too many classes. Mr. H. V. Heneschke supported the remarks of Mr. Murphy.

MORCHARD (Average annual rainfall, 13.50in.).

September 22nd.—Present: 17 members.

LUBRICATION.—Mr. H. G. Kupke, who read a paper dealing with this subject, said the proper lubrication of all farm implements, machinery, and vehicles, was a point very much neglected by the average farmer. In the first place it was necessary to secure the most suitable class of oil or grease for the type of machine that was being used. Cheap oils should never be used because, as a rule, they contained but very little lubricating properties. He was of the opinion that the cost of replacing worn out parts could be cut in half if farmers used oil of the very best quality. In addition to obtaining a good class of lubricant, it was essential that care should be taken to see that the oil or grease reached every working part of the machine. An interesting paper dealing with the subject, "The Storing System *versus* the Pooling of Wheat," was contributed by Mr. E. J. Kitto.

WEPOWIE (Average annual rainfall, 13.54in.).
September 25th.—Present: eight members.

SUPERPHOSPHATE.—In the course of a paper dealing with this subject, Mr. J. T. Burns said remarkably good effects could often be produced with heavy dressings of super compared with the light dressings, which many farmers until recently had been in the habit of using. South Australian farmers as a community used heavier dressings of super per acre than was the case with Victoria or New South Wales, but as South Australian farmers began to win their way in the other States they took with them the methods learned in South Australia and applied the more substantial dressing, which had been the custom in this State. All lands did not require the same treatment, but it was not the habit of the average farmer to proceed on those lines. The scientific users of artificial manures were rarely to be met with outside the Government Agricultural Colleges and Experimental Farms. The Director of Agriculture had stated that with some necessary improvements in farming practice South Australia was capable of a maximum wheat average of 20bush. per acre as against 11bush. average. Those improvements were an all-round increase in the quantity of super used per acre; secondly, more thorough tillage; thirdly, improvement in type of seed wheat usually sown. In the discussion that followed, Mr. T. F. Orrock said that it would be found profitable to sow super on pasture land about once in two years. Mr. W. F. J. Smith advocated heavier dressings of super than were usually applied.

WARCOWIE, September 19th.—Mr. W. Crossman read a paper, "The Divining Rod," and a keen and interesting discussion followed.

WEPOWIE, August 28th.—Messrs. T. F. Orrock and J. F. Burns gave an interesting and detailed account of the tractor trial recently held at Whyte-Yarcowie. It was decided that future meetings of the Branch should be held on the Tuesday evening on or before full moon.

WILLOWIE, August 23rd.—The report of the delegates who attended the Tractor Trial at Whyte-Yarcowie was received, and an interesting discussion followed.

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

CRYSTAL BROOK (Average annual rainfall, 15.62in.).
September 21st.—Present: 13 members and visitors.

TOMATO CULTURE.—Mr. A. J. Sarre read a paper from which the following is extracted:—The tomato is a native of the warmer parts of America, and was introduced into Europe in the sixteenth century. It belongs to the family of solanums, of which the potato and tobacco are also members, so it is reasonable to believe that diseases and pests that attack one of these will also attack the others. Blight annually takes a heavy toll of tomato growers. A wet summer, which is beneficial to most growing vegetables, considerably shortens the life of the tomato, because it is conducive to soft growth, which is attacked by the blight. Herein lies a warning not to over water. Too much water builds up a soft plant. Any fairly good garden soil will grow tomatoes, and a liberal application of wood ashes at planting time, with a sprinkling of bonedust and superphosphate after the plants are established, will be beneficial. One planting where a previous crop has been heavily manured with stable manure is suitable, providing the other crop has been a vegetable of a different nature. Being a tropical plant it requires warmth to grow to perfection, hence, in temperate climes, unless one goes to a deal of trouble it is not a wise policy to plant out in the open ground until the warm weather approaches. Of course, there are some exceptional places in our own State where they can be grown practically all the year round, owing to a mild winter and absence of frosts. To start plants fairly early one requires a hot bed. To make this make a shallow frame without a top or bottom, and place in it 3in. or 4in. of soil. Sow the seed thinly and press them down firmly with a board, covering the seed lightly, and add a mulch

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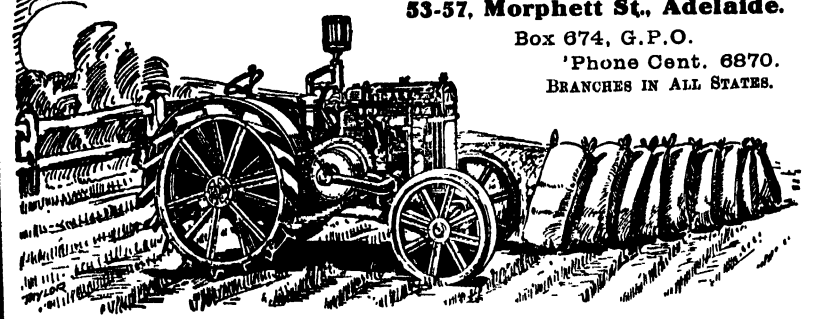
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of sifted manure or sawdust. Keep this moist for a few days and provide a covering of hessian or glass. If using hessian, the seedlings will grow slowly, but will be hardy, whereas if one forgets to remove the glass on bright days the plants will be drawn and spindly. To harden the plants further they should be picked out into shallow boxes containing about 3in. of soil, allowing about 3in. between each. If buying plants see that they are dark in the stem, because that denotes that they have been hardened off. The top may be a bit yellow and ragged, but that is no fault, as they will start to grow almost immediately. Unless one is prepared to go to a lot of trouble it is quite early enough to plant the tomatoes out in August and September. In many years' experience I find that on the whole the later planted ones yield fairly early fruit with less trouble than do those planted out in June and July. If possible, rough dig the ground some considerable time ahead and dust it with lime; then when ready to plant out dig it again and pulverise it as finely as possible, at the same time digging in artificial manure, such as bone dust, bone super, &c. Do not use coarse stable manure at this time. Water sparingly whilst growing, too much water tends to produce leaf. If possible plant upon new ground each season. By so doing you stand a better chance of escaping the ravages of bacterial blight and other forms of disease, which plays havoc with the plants. New districts are free for a season or two, but then the disease breaks out, the spores probably having been carried there by second-hand cases. Spraying whilst the plants are young with Bordeaux or Burgundy mixtures sometimes helps to check the diseases. To produce early tomatoes it is necessary to plant varieties that produce their fruit from the first cluster of flowers. The best early variety that has come under my notice is the Early Dwarf Red. It is a sure cropper, and, if well cultivated, will produce a quantity of large fruit with a fairly smooth skin. It will also produce fruit under almost any conditions. I have had beautiful fruits from this variety weighing as much as 16oz. and 18oz. each. There are other excellent early varieties, such as Chalk's Early Jewel and Earliana, which produce meaty fruits of a milder flavor than the dwarf, but they grow taller and are not such sure croppers. Measure out the positions for planting by driving stakes into the ground previous to planting, the dwarfs at 2ft. apart and 3ft. between the rows, and the taller ones 3ft. apart and 4ft. between the rows. By putting in the stakes first you do not damage the roots as is often the case when driven in when the plants are large. Where stakes are used one is able to get amongst the plants at all times to cultivate, examine, and, if necessary, spray them. The air can circulate amongst them and so keep them healthier. Good cultivation during growth keeps down disease. One hears many complaints of the shortness of the life of the tomato plant nowadays. Granting that disease does play havoc more than it did in the early days, yet it is reasonable to expect such a heavy cropper as the early dwarf, for instance, to wear itself out in a few months. Pruning in some form or other is followed by most commercial growers. The one stem style is to train the plant up the stake, pinching out all side growths rising in the axils of the leaves. If after the plants have, say, three clusters of buds, the top of the plant is also nipped out the fruit will probably set. A new shoot will then grow out at the top and carry on. The growth being rapid, one has to attend to the ties fairly often. Binder twine is useful for tying to the stake. If you are growing the tall varieties on the above plan, they may be planted closer than the 3ft. before mentioned. Another method of pruning is to retain about four stems instead of the one, but follow the same practice of nipping out the side shoots when the heat of the summer comes. It is sometimes advisable to give the pruning a rest, just taking out enough foliage to allow the air free circulation amongst the plants, otherwise the sun will scorch the fruit. Still another form of training is on a trellis or large mesh wire-netting, allowing about six stems to the plant, the side shoots still being nipped out. Later varieties could be planted at the same time as the early ones, to come into bearing when the earlies are going off, or the early ones could be sown later to keep up a continuity. Do not make the mistake of planting tomatoes in the same place as they grew last year "just because they did so well there last time," nor yet plant them where potatoes grew or you will be inviting trouble. The diseases of one will attack the other, and even the insects damaging one will pass on to the other. Other grubs or caterpillars that are troublesome are the cut worms, which eat into the tomato plant at ground level, the plant then topples over. This grub works at night and hides just below the surface of the

ground in the daytime. It is of a dull slaty appearance and can be destroyed with 1oz. of Paris green and 11b. of bran and pollard mixed; moisten with sweetened water, work into pellets, and place around the plants. Keep children away from the plants at this time. Another caterpillar that attacks the fruit, working around inside of the early ones and then passing on to another one, can be destroyed by spraying the fruit when young with Paris green, but the most reliable remedy is to examine the plants frequently and kill all of the grubs that you can find. Sometimes by jarring the plant you can dislodge this pest. With a view to preventing too great a change in the temperature of the soil, watering should be done in the early hours of the morning when the soil is coldest. The amount of water required is a much debated phase of tomato culture. I have seen healthy plants bearing good crops of splendid fruit in fallow ground without artificial watering. On the other hand, I have also seen plants started with a little watering, and then being neglected give most disappointing results, the fruit being small and tough. Then, again, plants that have received a good and continuous soaking have yielded the largest fruit of the whole plot. Water should be applied by trench after the fruit has set, if sprayed on to the fruit it causes cracks. Most of the diseases to which the tomato is liable are of the plant, but a disease of malformation that spoils a lot of fruit is what is known as "Jack" tomato. It forms hard cores in the fruit, and perhaps one portion ripens nicely and the other part is hard. Many plants form and ripen perfect fruit at first, but the later ones will develop as described, and the plant also develops malformation. In the discussion that followed, Mr. H. J. Firth said that those who were engaged in wheatgrowing had proved that the rotation of cropping was a good thing, and he asked if Mr. Sarre would recommend adoption of similar methods in tomato cultivation, and whether the cause of tomatoes only ripening on one side was attributed to disease or scalding of the sun. Mr. Sarre, replying, said that tomatoes should not be planted in ground which in the previous year had been planted with potatoes. Good results should result from rotating with peas, as peas supplied nitrogen, which was an excellent plant food. It was not advisable to use fresh stable manure for tomato cultivation. The cause of partial ripening was scalding by the sun. Mr. G. E. Gum asked whether planting on a former onion plot would prejudicially affect the onion crop the second year, and whether young plants with long roots should be planted to full depth or whether the roots should be spread out. Mr. Sarre, in reply, said one could plant onions on the same plot for a generation without any fear. Tomatoes being a shallow rooted plant, the roots should be spread.

FARRELL'S FLAT.

August 24th.—Present: 18 members.

CARE OF MACHINERY.—The following paper was read by Mr. E. G. Pratt:—"As a rule, in our district, we experience very wet winters, and the time when the land can be worked to the best advantage is limited. In the summer we have a large percentage of damp days, which considerably delay harvesting. Therefore, for the efficient working of a farm it is absolutely necessary that the farmer should keep his implements in as good condition as possible, so that when weather conditions are satisfactory he can make the best use of the time at his disposal. Nothing is more annoying to the modern farmer than to be hung up for several hours or days with a broken implement. Old, worn out, and out-of-date small machinery should, if the farmer can possibly afford it, be replaced by new and modern machinery. In many cases old and worn out machinery does not do the work properly and costs more in time wasted and repairs than would pay for a new machine. One large modern implement will often do the work of two small out-of-date ones, thereby effecting a saving of labor. In purchasing a new implement the farmer should remember that in all probability he will be working it for the next 10 or 12 years. If the farmer considers buying an implement, which he cannot inspect under working conditions, it is a good plan to ask the firm for a trial, and secondly, to see that fittings can be obtained with the least possible delay. Most firms send out books with code words for parts, and these should be kept and the code used when wiring for new fittings. In selecting a plough or cultivator it should be observed that the shares should be of a type that is always obtainable and easily and quickly put on and taken off. A good point in many cases is to select a new implement of the same make as the old one, because quite a number of the fittings from the old machine will come in

useful for repairing broken and worn out parts. Ploughs, cultivators, and harrows should be of the stump-jump pattern, unless all the land likely to be worked is absolutely free from stones. Lubrication is an item sadly neglected by too many farmers, and effective lubrication is, I consider, half the life of a machine. It is not sufficient to buy a tin of oil, and oil the harvester or binder at regular intervals. For harvest time a lubricant should be selected with a good, heavy constituency that will retain its body on the hottest day and also when exposed to heated bearings. Many heavy-bodied oils only retain their body while in the shade, and so soon as they are exposed to the heat of the sun or used on a heated bearing they become like water and run out. The result is that the driver has to oil very frequently or else there is considerable wear and even danger of fire. Certainly no oil will retain its original thickness after it has been exposed for three or four hours to the sun, but if it has a good, retentive body it will remain stringy and adhere around the bearings instead of running off. Of course, the best oil is useless without the operator sees that it reaches the bearings. All small oil holes should be cleaned out with a piece of thin pointed wire at least once a day, so that it can be seen if the oil is going into the larger bearings. For plough and cultivator wheels I find that when oil only is used much of it goes straight through and drips out on the other side. To prevent this I tried mixing a small quantity of melted fat with the oil and obtained better results. I consider that the used oil from cars, mixed with fat, would do very well for this purpose, and would remind one to clean the oil out of the car more frequently. For wagon, dray, and buggy wheels, &c., it pays to buy the best axle grease. All tillage implements, such as ploughs, cultivators, &c., should be lifted at the corners when turning, because turning with the implement in the ground strains it, particularly with big implements. This practice also has a bad effect on the horses. A good tool box should be fixed to every implement, and in it carried the necessary wrenches, a hammer, a few bolts of various sizes likely to be needed, several split links, and a piece of wire. The wire should not be used if the implement can be fixed with bolts, and, if used, should be taken out at the first opportunity and the part properly fixed. When finished with, ploughs and cultivators should be taken from the paddock and placed where stock cannot rub against them, and the weight of the implement should be rested on the ground, not on the wheels. It is not necessary to place implements of this kind in a shed, but a coat of paint every few years will be beneficial. In spare time it is a good plan to overhaul and put them in good order. Harrows should be placed where they will not be dangerous to stock. The harrow heads should be put in a shed and given a coat of tar. All other machinery should be placed in a shed as soon as possible, and all belts removed, oiled, and rolled up, care being taken not to make the roll too small at the start and so crack the leather. Binder canvasses should be removed, rolled, and hung up where mice cannot reach them. On wet days the machinery can be thoroughly overhauled, new parts obtained where required, and everything put in order. Poultry should not be allowed in the implement shed, because they litter the machines and do a certain amount of damage. The ideal shed for implements is a stone building with an iron roof and sliding doors, but a straw roof is very satisfactory if kept well covered. A blacksmith's shop, with the necessary tools, will be found very useful and economical in keeping the machinery in good repair. It should be erected in a place well away from stables, stacks, &c., and in a position where machinery can be pulled up close to it, care being taken to make it large enough to admit any implement. Every tool should have a special place and be kept there and not be left lying in the place where it was last used. Gates should be made sufficiently wide to take implements through without danger of hitting the posts. A good plan is to have a wide wire gate near the other gates through which to take the machinery. The windmill requires very little attention, but one should not forget to grease it occasionally and to see that everything is in order. The engine should be placed in a closed-in shed and kept clean. It should never be overloaded or allowed to run too quickly. The inlet valve should be held in whilst the engine is running down after being stopped, because bumping against the compression whilst slowing down is detrimental to the bearings. The chaffcutter also requires covering, but should be in a position where a load of hay can be pulled up into a convenient position for cutting. The saw should be kept covered and have a coat of grease smeared over it when not in use. It should be kept thoroughly sharp and properly set, because a blunt and unset saw is dangerous. Most imple-

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"Forrestville, S.A., 4/7/21.

Dear Sirs—It gives me much pleasure in relating to you the wonderful results I have obtained in using 'KARSWOOD' Poultry Spice. My friend, Mr. Robinson, advised me to try it six weeks ago, he having used it with splendid results, so I sent straight away for a packet, and in the first week I could see the difference in my hens. I might tell you they were hanging in the moult, and after a fortnight of 'KARSWOOD' they had completed the moult and had actually started laying, and, thanks to the spice, they have been going strong ever since. I have been telling my friends about 'KARSWOOD' Poultry Spice and its results; but one or two doubted my word, so I brought them down and showed them my Rhode Island Red Pullets and the eggs I was getting, and I can tell you they altered their tune; they have some the same age as mine and they are not laying yet, so they now intend to give 'KARSWOOD' a trial. I thank you for your letter, and I will be very pleased to receive the book when it arrives. You may make use of this letter with pleasure.

(Signed) H J. BRADLEY."

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And commence to-morrow. Within a fortnight or three weeks you will see good results. If your local dealer cannot supply you he can get stocks from the agents named below.

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2s. packet (1lb.) supplies 20 hens 32 days.
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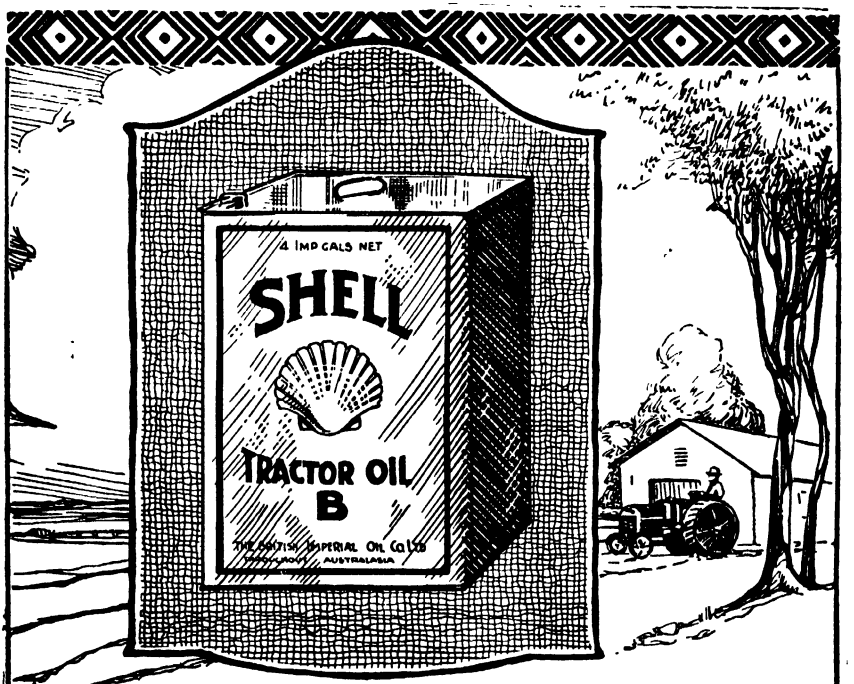
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ments are sent out with a book of instructions and these should be followed as closely as possible. No implement should ever be worked in a damaged condition, because there is danger of it doing more damage than good. Last, but not least, a coat of paint applied to any machine is always a good investment."

LAURA.

MAINTAINING SOIL FERTILITY.—At a recent meeting of the above Branch, the following paper was read by Mr. F. T. Hughes:—"Chemical fertilisers are widely used, but little understood. A certain amount of super is applied to land and if a substantial increase of crop is obtained, most farmers are satisfied. They, however, do not stop to think whether they are reducing the value of their land or increasing its power to produce good crops. Before superphosphates were introduced we expected to grow two crops in succession, but now it is very rarely that a cropped stubble paddock will yield a profitable crop. There must be some reason for this. Either we are not using the right fertiliser or we are destroying the texture of the land by our method of fallow, crop, burn, and fallow again. Fertilisers containing nitrogen are beneficial to crops, but are too expensive for cereals, so some other source must be sought to supply this plant food. When agents first came around on their mission of selling seed and fertiliser drills one of their chief stock arguments was that 40lbs. of seed per acre, sown through the drill, was as good as 60lbs. sown broadcast. It was stated that the saving in seed would soon pay the cost of the drill. It was also affirmed that 40lbs. of super would give an increased yield of from 8bush. to 10bush. per acre. These statements were confirmed by experience. When our neighbor got his drill he used the quantities referred to above, and his crop produced between 26bush. and 27bush. to the acre. We broadcasted a bushel of wheat to the acre and only reaped 17bush. to the acre. At present we use 75lbs. of seed and from 70lbs. to 80lbs. of super, but very rarely reap more than 25bush. to the acre; often only 20bush., and sometimes less, notwithstanding the fact that better cultivation methods are adopted. The reason for this reduction in yields, in my opinion, is our method of fallow, crop, burn, and fallow again. This causes the removal of organic matter from the soil, which means poorer crops and greater difficulty in working the land. Land, under this method, becomes excessively poor and quickly hardens. There is also an absence of worms, even when the soil is in an ideal condition for working. This reveals an absence of organic matter necessary for an ideal condition of the land and various forms of soil life, which in turn prepare the plant food so necessary for good crops. The time is fast approaching when Australian farmers will have to find some means of returning to the soil the organic matter that is being fast removed under present methods. One way to do this is by the application of stable manure, which should be carted from the stable and spread from the dray; not tipped in heaps, because by this latter method much of its value is wasted. The natural place for the manure is on the surface where the rain can wash its goodness into the soil, and the sun break down its texture, thus providing food for the myriads of soil organisms which manufacture plant food. As this method of manuring entails a great deal of labor, and the supply is limited, other methods must be discovered to achieve the same results. A good burn is very useful for cleaning up the land, and at the same time destroying take-all, and I believe it would be a good policy to burn the stubble and sow oats or Subterranean clover, or a paddock of each. The Superintendent of Experimental Work of the Agricultural Department (Mr. W. J. Spafford) says that Subterranean clover is a collection of nitrogen, and greatly improves land for other crops It should be sown in autumn so that it may start with the first rain. If half the stubble land was scratched over and sown with this very useful plant each season, and this continued until the whole farm has been covered, no further sowing should be necessary, because it is said to stand cultivation and come again when the land is left out. After sowing the clover it would be possible in many cases to get the crop in, after which the remainder of the stubble land could be sown with oats. While this means more cropping than at present, sheep would profitably harvest the clover, and in many seasons oats also. By adopting this method a large quantity of organic matter removed from the soil by wheat growing would be replaced. In good seasons, when there is a good growth of feed, the oats could be cut for hay and stacked. When the



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feed was beginning to get scarce, the oaten hay could be fed to sheep, thus returning a valuable manure and improving the land. What is termed green manuring is growing a good crop of green stuff, ploughing it in, and allowing it to rot. This greatly improves the land, but it seems a wasteful method, in view of high values for land and wool and mutton in great demand. With the growing of a nitrogen-collecting and fixing plant, and feeding it off, soils can be restored to their original fertility in a far more profitable way. The replacing of organic matter in the soil will provide food for worms and other soil organisms without whose aid vegetation cannot flourish. Land with a good supply of organic matter will not wash out so much or lie wet to the same extent as land deprived of it, because this seems to smooth over the grains of the soil, keeping them more loose and so absorbing more moisture and retaining it for a longer period.

MANNANARIE.

September 20th.—Present: nine members.

PREPARATION OF FALLOW.—The following paper was contributed by the Hon. Secretary (Mr. W. Crawford):—"No definite system for the preparation of fallow that will suit all classes of soil and climate conditions can be suggested, but I find the following system to be very satisfactory in this locality, where the farmers' main object is to grow wheat. If stubble land is to be fallowed, the straw should, if possible, be burned towards the end of the summer, but if the summer has been wet, and the straw contains green summer growth, burning should be delayed until the commencement of frosty weather. Commence fallowing as soon as seeding is completed, providing the land is not too wet nor too hard to make a fairly decent job, and do not plough deeply unless weeds have made a good growth; from 2in. to 3in. is quite deep enough for early fallowing. Shallow fallow provides the best opportunity for the germination of weed seeds. As the season advances, and weeds make a good start, plough slightly deeper, but do not exceed 4in. Deep fallowing is not necessary for growing good crops in the district. The first land fallowed should be harrowed twice across the ploughing about the end of July. The fallowing should be finished by the end of August, and the harrowing by the end of September. All land fallowed should have at least one good rain on it before it is harrowed down. After the paddock has been harrowed, put sheep in occasionally when the surface soil is dry, to eat off any green stuff, but on no account have sheep on the fallow while the land is wet. All fallow should be cultivated before harvest, the later the better, because late cultivating destroys many of the summer weeds. If possible, cut out all thistles, and cart stones off the fallow before harvest. Keep the fallow clean with sheep during summer and early autumn. Should there be too much growth for the sheep, the cultivator must be set to work, but I do not favor summer cultivating when summer weeds can be destroyed by any other means."

BOOLEROO CENTRE, September 5th.—The Vice-Chairman of the Advisory Board of Agriculture (Capt. S. A. White, C.M.B.O.U.), attended the meeting and delivered an address, illustrated with lantern slides, "Across Australia by Motor Car."

BUNDALEER SPRINGS, September 24th.—The paper "Farm Management" that had been contributed at the Annual Congress was read by the Hon. Secretary (Mr. M. J. Cronin). The report of the delegates to the Annual Congress was also received and discussed.

BLYTH, September 18th.—The subject, "Mouse-proofing Hay Stacks," was brought before the meeting by Mr. Drennan, and an interesting discussion followed. To a gathering of over 250 people, on September 7th, Captain S. A. White, C.M.B.O.U. (Vice-Chairman of the Advisory Board of Agriculture) delivered an address, "Through Central Australia by Motor Car," under the auspices of the local Branch of the Agricultural Bureau.

REDHILL, September 25th.—The meeting took the form of a "Useful Hints Evening," when several useful hints for the saving of time and labor were brought forward.

MANNANARIE, August 30th.—Mr. H. J. Apps (Assistant Dairy Expert) attended the meeting and delivered an address, in which he dealt with several aspects of the dairying industry. Mr. F. C. Richards, of the Department of Agriculture, was also present, and in the course of a short address explained the Aims and Objects of the Agricultural Bureau

NORTH BOOBOROWIE, September 25th.—Messrs. Mudge and Giles read papers from the *Journal of Agriculture*, "Rotation of Crops" and "The Care of the Farm Horse." A good discussion followed The report of the delegates to the Annual Congress was also received and discussed.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

TARLEE.

September 24th.—Present: 17 members and visitors.

CONSERVATION OF FODDER.—Mr. A. L. Molineaux read a paper on this subject (*see* report of 1923 Annual Congress). In the discussion that followed, Mr. D. L. Clarke thought the expense of employing so many hands necessary to man a thresher was a disadvantage to a small farmer; several farmers could combine and do their threshing together. The idea of conserving grain was an excellent one. Many farmers had not yet fully realised the benefit of conserving corn to feed, particularly to sheep, during a dry spell in autumn. Mr. L. Molineaux said in threshing the crops and stacking the fodder for food for stock it would be found that the stock would always eat their way into the stack on the side on which the elevator had been situated. It was, therefore, a good plan to distribute the chaff evenly with the straw in building the stack. He said horses did well on threshed straw. Mr. W. G. Branson asked "if weevil would go right through where corn was shot." Mr. A. E. Reed replied in the affirmative, and added that the weevils would do considerable damage if the storage place was kept dark.

ROSEDALE, July 26th.—Twelve members attended the July meeting of the Rosedale Branch, when a paper dealing with the subject "Fallowing" was contributed by Mr. G. C. Hienjus.

WINDSOR, August 21st.—The President read an article dealing with the hand feeding of sheep, which provoked a keen discussion. Addresses were also given by Messrs. Ryan and Dawkins, of the Two Wells Show Society. Mr. H. W. Kenner (Hon. Secretary of the Two Wells Agricultural Bureau) was also present, and read a paper, "The Relationship of the Agricultural Bureau to the Agricultural Show Society.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

MOONTA, August 25th.—The Hon. Secretary (Mr. J. Lawry) read a paper, "Tractor *v.* Horses," from the *Journal of Agriculture*, and an interesting discussion followed, in which Messrs. H. Cadd, T. Cliff, G. Page, A. Middleton, E. Atkinson, F. Trennery, D. Kitto, and A. Ferguson took part.

WESTERN DISTRICT.

CARROW.

August 23rd.—Present: 14 members.

SELECTION OF FARM IMPLEMENTS.—"For the growing of wheat in South Australia, the selection of implements is an important item, and small implements are not satisfactory or economical," said Mr. A. Freeman, in the course of a short paper under the above title. For fallowing, the speaker recommended

a six-furrow light draught plough. If the land were fairly free from stumps he thought a combined drill and cultivator would prove most satisfactory. For harvesting operations he favored the stripper and motor winnower. He also referred to various types and makes of engines, chaffcutters, &c., and thought a wagon with a medium weighted body and wide tyres would prove most serviceable in sandy country. A good discussion followed. It was decided that all future meetings of the Branch should be held on Wednesday night, at eight o'clock, on or before full moon.

DARKE'S PEAK.

August 22nd.—Present: nine members and two visitors.

COWS ON THE FARM.—"Cows are a necessary on every farm, but very little trouble as a rule is taken with them except to see that they provide milk and butter for the homestead," said Mr. G. A. Noble, in a paper dealing with the subject, "Cows on the Farm." To obtain the best results from the cow it was necessary to treat the animal with kindness, he said. It was advisable to allow the women folk of the farm to tend to the handling and feeding of the animals. When natural feed was scarce, and especially during the summer, he recommended feeding the cows in the morning with two kerosine tins full of oaten chaff and 1½lbs. of molasses, the feed to be damped before being fed to the cows. For the evening meal he suggested two tins of cocky chaff and 2lbs. of oats. Twice during each week one handful of salt should be added and mixed with the feed. One and a half pounds of molasses should be mixed with 4galls. of water. He also thought it advisable to make provision for green fodder by preparing a plot of land and broadcasting 10lbs. to 15lbs. of lucerne seed to the acre, just after a good rain had fallen. The seed could be covered with a set of light harrows. In the discussion that followed, Mr. H. Noble thought it better to feed the cows on hay rather than on chaff. Mr. Kobelt had found a mixture of cocky and hay chaff, molasses, and bone meal an excellent ration for dairy cows.

KOPPIO (Average annual rainfall, 22.40in.).

August 21st.—Present: 11 members.

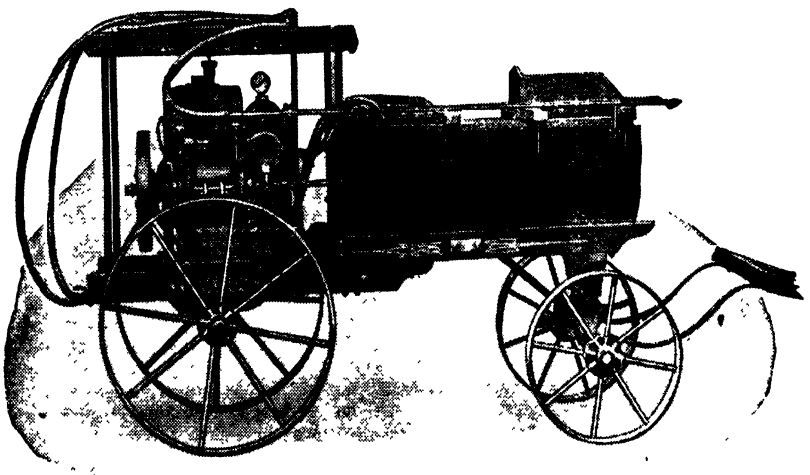
TABLE GRAPES FOR THE HOMESTEAD.—Mr. F. C. Barraud contributed the following paper:—"The grape vine is one of the hardiest fruit bearing plants. It can be grown over a very large area, provided it is properly handled. With climatic and soil conditions such as we have in this district, and a limited number of plants well looked after, the vine will provide the home with fruit for a number of months in the summer. The high quality table grapes that are grown for commercial purposes are generally grown on rich, deep soil, well supplied with organic matter, but this fact does not prove that good fruit cannot be grown on a soil of lesser quality. Annual rainfall of from 15in. to 25in. is suitable for vines. When the subsoil receives a good soaking and the soil is well tilled, the moisture will be retained for many months. In choosing a position for a small vineyard, preference should be given to a spot between the hills, fairly exposed to the sun and wind and yet sheltered on the eastern side if possible, to obviate late frosts damaging the vines. If late frosts strike the garden when the leaves and bunches are young and tender, they sometimes destroy most of the crops. Land for vines should be deeply worked, and the subsoil should not be brought to the surface where avoidable. Well rotted stable manure or bonedust should be mixed with the soil. This class of manure will help the young vines for a long time. If they are to be worked by hand and the soil is rich, the vines should be planted 6ft. by 6ft., but if to be worked by horse implements, 10ft. by 10ft. would be preferable. Two methods of training vines are the trellis and the gooseberry bush systems. The latter, providing you are treating vines which are pruned annually to two or three buds, returns beautiful fruit. On the other, if you are working vines which do not fruit freely so low down on the spurs, there is little hope of doing away with the trellis in some shape or form. When a rooted cutting is received from the nursery, it is necessary to prune it back to one bud, and after it has struck, again prune it back to one bud. The stem should not be more than 10in. or 12in. clear of the branches. Do not raise the frame work in the trellis too high, because the higher it is, the more the fruit is exposed

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to winds and bird pests. Tillage of the soil means much to the growth of the plant. The best method is to plough the land deeply, say 5in. or 6in., as soon as the first autumn rains will permit, and then leave it to sweeten with the action of the sun and air. After winter rains are over and spring is approaching, take the plough and cross work the land, turning in all the weeds. After ploughing is completed, keep the cultivator and harrows going, to make the surface fine and dry, thereby preventing the evaporation of moisture. If rain, say ½in., falls after the land has been worked, again give the surface a good harrowing. Soil fertility must be kept up to a high standard if the vineyard is to be a success. An occasional good dressing of farmyard manure will prove highly beneficial to most soils, and if one has to fall back on artificial fertilisers, bonedust and then superphosphate are helpful. A good dressing consists of 2cwts. of bonedust and 1cwt. of sulphate of potash. This should be applied close to the plants, and not over the whole surface of the land if you wish to obtain the best results."

McLACHLAN.

September 1st.—Present: 13 members and three visitors.

TAKE-ALL.—In the course of a short paper dealing with this subject, Mr. Jericho said take-all generally appeared in the third crop when the seed had been sown in light land. To reduce the risk of the disease making an appearance, Mr. Jericho was of the opinion that the third crop should be of oats, and after the crop had been reaped the stubble should be burnt, and the land left for grazing with sheep as long as possible. If the land was heavily stocked with sheep in the early part of the season and late in September, the danger of take-all would be reduced to a minimum. When being prepared for a crop, the land should be thoroughly fallowed, harrowed three weeks after the completion of ploughing, and kept as free from weeds as possible during the early part of the season. If the land was likely to become water-logged, it would be necessary to work the plough at a shallow depth, the main point being to expose the roots of all plants to the air. If it was proposed to crop stubble land, it should be thoroughly broken up, and left exposed to the air for about three weeks before the crop was sown. The speaker also contended that the exposure of the roots of plants to the air had a tendency to check take-all. When the land was too poor to grow sufficient stubble to carry a fire, the second crop should be on fallowed land, and the third crop should consist of oats, so that sufficient straw would be provided to destroy the mallee shoots. The next year the paddock could be left out for feed. When the land was again brought under the plough, the first crop should be wheat, followed by oats, and then left out for grazing. He thought that a profitable crop could also always be grown on hay stubble if the land was ploughed, the roots of the plants exposed to the air, and then left for three weeks before the crop was sown.

MOUNT HOPE.

September 10th.—Present: 11 members and visitors.

HAND FEEDING SHEEP.—Mr. H. Doudle read a paper, "Does it Pay to Hand Feed Sheep?" and in the discussion that followed, Mr. R. C. Myers said he had fed sheep on hay with a fair amount of success, but found there was a good deal of waste. He was of the opinion that with cheaper labor, hand feeding of sheep would pay in that district. He also thought that with ordinary troughs there would be a waste on account of the chaff getting wet or blown out with the wind, and thought sheds should be built over them. Mr. Myers said a feeder in the form of a larger hopper with troughs around it could be built. The hopper could be filled and then fed automatically into the troughs. Mr. W. Mahoney was in favor of hand feeding and intended to give it a trial next year. Mr. J. Doudle said he had been hand feeding his sheep the last three or four years and found it a success. He had fed hay chaff mixed with barley. Mr. J. R. Winstanley had given hand feeding a trial and found it a paying proposition. Mr. G. A. Vigar was not quite sure the system would pay in that district, and doubted whether in the case of one man working a farm if it would pay to cut the crop for hay and feed it to the sheep, or whether the crop should be reaped and the grain sold. So far, he was inclined to think the latter would pay the better at the present price of grain. Notwithstanding that, he meant to try hand feeding on a small scale.

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TALIA.

August 19th.—Present: seven members and two visitors.

RABBIT DESTRUCTION.—Mr. J. McBeath, who read a paper dealing with this subject, first referred to the alarming spread of the rabbit pest and the many attempts that had been made to exterminate the pest. The farmer and small landholder with netted holdings should be able, by the adoption of the following method, to keep his land almost entirely free from rabbits. In the first place, all the holes and warrens should be fumigated either by the engine exhaust method or a machine specially designed for the purpose. If the warrens were treated properly fumigation should account for all the rabbits in the burrows, but in a country that carried a good deal of bushy growth many of the rabbits spent but very little of their time in the burrows. During hot weather a subsoiling plough should be obtained and all the warrens should be ploughed out as deeply as possible. The rabbits that still remained on the property, Mr. McBeath believed, could easily be caught with traps and dogs.

TALIA.

September 8th.—Present: 10 members and visitors.

HORSES ON THE FARM.—In the course of a short paper under the title "Too Many Horses on the Farm" Mr. J. Graham said it was not profitable to have too many horses on the farm. In districts where the area of the farms was comparatively small, from 10 to 12 horses should be sufficient working strength, but one frequently noticed considerably more than that number of horses. If farmers were to keep sheep, instead of the extra horses, it would be more profitable. Breeding horses on small farms, in the opinion of Mr. Graham, was unprofitable, because in the first place the farmer lost the use of the breeding mares for three or four months of the year, and secondly, the young horses caused a good deal of trouble in pawing at the fences and damaging gates. The speaker considered that 50 ewes would return the price of a good farm horse from the wool and mutton, and the natural increase of lambs would make the sheep a more profitable source of revenue than horse breeding.

WIRRULLA.

August 25th.—Present: 20 members and nine visitors.

HANDLING OF YOUNG HORSES.—Mr. S. J. Pearson, who read a paper dealing with this subject, said it was very difficult to make a hard and fast rule as to how a colt should be handled, because the temperament of each animal was so different. As a general rule, however, the speaker suggested that the young horse should be run into a strong yard with a mob of other horses so that the animal would not become unduly excited. A stout post should be placed in the centre of the yard, and with the aid of a lassoo very little difficulty should be experienced in catching the colt and bringing it up to the post. Next an attempt should be made to put on the headstall as quickly as possible. If the colt objected to being touched on the head a piece of bagging tied to a light stick and rubbed over the animal's head would, as a rule, show the animal that it had nothing to fear. Great care should be taken not to hit the colt on the head, and it was a mistake to knock the teeth of the colt in order to make it open its mouth. If the thumb was inserted into the side of the mouth of the colt no great trouble would be experienced in placing the bit into the mouth. One end of a rope should then be passed through the near side bit ring, whilst the half hitch would still be kept around the post and a start made to mouth the colt by making it run around the yard. After the colt had run around the yard in one direction, the rope should be changed to the other side of the bit, and the performance as in the former case repeated. When the colt answered the pull on the rope fairly well it should be led out of the yard, but care should be taken not to keep the colt occupied in that manner for too long a period, because there was a danger of it becoming sulky. The speaker suggested that the colt should be hobbled and turned loose in the yard, and every hour or so the farmer could go into the yard and catch the animal. If that was done for half a day it was only on very rare occasions that the lassoo would have to be called into use again. Next day the colt should be harnessed between two quiet workers in the plough, and for the first few days it should not be worked too hard or for too long. The colt that was of a wild and nervous disposition required different treatment from the foregoing. The animal that was inclined to be fractious should be handled

quietly, yet in a firm and confident manner, the speaker being of the opinion that nervousness in a horse was caused by nervousness being displayed by the breaker at the time the colt was being broken in. The horse with a savage nature should be handled with all kindness possible and given a fair trial, but if the animal still showed unmistakable signs of vice it was better off the farm, for such an animal was a source of constant danger to those who had to handle it. For the colt that sulked after it had been roped, the speaker considered the best plan to adopt was to fasten a set of hobbles on the animal and leave it alone for a few hours, and to repeat the practice until the colt was cured of its bad habits. Much more careful handling was required for saddle and harness horses, because it was most essential that they should be taught to answer the rein readily. To teach the horse to carry his head in a stylish manner the speaker suggested the following plan:—"Pass a strap through a ring and fasten the ends of the strap to the rings of the bit. Then pass another strap through the centre ring and secure it to the surcingle, drawing it tightly, which will cause the colt to bring its head well back and induce it to arch its neck."

BUTLER, September 4th.—The September meeting of the above Branch was attended by the Superintendent of Experimental Work (Mr. W. J. Spafford) who delivered an address in which he dealt with the subjects, "Cultivation of the Soil," and "Top Dressing Pastures."

MILTALIE, August 24th.—Mr. D. P Bagnell tabled a fine sample of tree lucerne, and an interesting discussion regarding its suitability as a fodder for that district followed. The meeting then took the form of a social evening.

MOUNT HOPE, September 22nd.—The meeting took the form of a "Question Box," when several subjects, including "Farm Tractors," "Fruitgrowing," "Early and Late Wheats," Side Lines on the Farm," and "Take-all," were brought forward, and an interesting discussion followed.

SMOKY BAY, August 25th.—The monthly meeting was held at Mr. E. Lovelock's residence. During the afternoon, members inspected the experimental plots being conducted in conjunction with the Department of Agriculture, and at the meeting which followed, several subjects of local interest were brought forward for discussion.

WUDINNA, August 31st.—The Manager of the Minnipa Experimental Farm (Mr. R. Hill) attended the meeting, and delivered an address, "General Farming Practices."

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

RAMCO.

August 20th.—Present: 11 members and three visitors.

FARMING AS A BUSINESS.—Mr. Jemison read a paper dealing with this subject. The writer pointed out that a farmer needed to work his land as a business and to keep records to be successful. He made mention of many points in which the farmer, by giving thought and adopting systematic records, could make savings. Mr. Jemison stated that he knew how lax farmers were in matters of record, and though the paper was not for fruitgrowers there was much that applied to them. Mr. Lewis agreed that the fruitgrower was often very lax in keeping proper records regarding the working of his property. He thought that the income tax had done much to educate both farmers and fruitgrowers to keep accounts. Mr. H. Green thought the keeping of records of stock, &c., was a point that the orchardists overlooked. Neither did they study conditions to enable them to ascertain the type and quantity of manure and the quantity of water that should be applied to the land. Mr. Odgers considered the paper gave one many points, especially the keeping of records, so as to know definitely what the different varieties of trees yielded.

A further meeting was held on September 24th, when Mr. E. Burroughs read an article, "Lucerne Cultivation and Management," and a keen discussion followed. Mr. J. J. Odgers also gave an account of the Annual Congress.

COONALPYN (Average annual rainfall, 17.49in.).
August 24th.—Present: seven members and 30 visitors.

MALLEE FARMING.—In the course of a paper under the title "Some Causes of Failure in Mallee Farming" Mr. F. Pitman said he had resided in the mallee areas for a considerable number of years and, after noting the methods adopted in clearing the land, had come to the conclusion that the average settler always tried to handle too much land, not only at the start, but also during the rest of his career. That such was the case was very clearly demonstrated when one noticed on many of the sections that some of the land rolled during the first year of the occupancy of the block still remained untouched. He was of the opinion that there was only a comparatively small area of land in their district of which it could be honestly said that it had been thoroughly reclaimed from scrub conditions, even though in some cases the present occupier of the block was the fourth settler who had been in possession. As a general rule, it would be noticed that those settlers who had been successful were those that had not attempted to deal with more rolled land than they could properly handle. His strong contention was "small areas of land properly worked rather than attempting to deal with large tracts of half cleared land, which were an eyesore to the district and a reduction on the value of the holding." A lively discussion followed. Mr. George disagreed with the views of the writer of the paper and contended that the best plan was to roll down a comparatively large area of scrub, and to endeavor to crop a large area in order to secure a good total return, even if the average yield was small. Mr. Tregenza agreed with the views of the writer of the paper. Mr. A. E. Gurner presented a paper, "Tractors," in which an interesting description of different types of machines was given. Mr. J. J. Cronin addressed the meeting on his observations at the Roseworthy Agricultural College Short Course for Farmers, and the meeting concluded with a supper and dance.

COONALPYN (Average annual rainfall, 17.49 in.).
September 21st.—Present: seven members and 10 visitors.

TOP DRESSING OF GRASS LANDS.—The following paper was contributed by F. J. Tregenza:—"From results obtained in older agricultural countries, from records of years of trial in Victoria, and from experiences in this district, one feels tempted to predict that within a few years the regular application of super to pasture lands will be a recognised practice by wide-awake farmers. The need for making every cleared acre produce more will eventually compel the man on the land to adopt this practice. Most of us have seen the stimulus which has been given to the ordinary grasses when, perhaps, the drill has been run out to empty on spare ground. In all probability stock have been run continually on this land, and hence no striking contrast has been noticed. Only when stock have been kept off such a piece of ground can the remarkable improvement in the growth of the feed be noticed, particularly in the early spring. If, for a total cost of 5s. to 6s. per acre per year, we can double the number of sheep kept, or the number of of cows milked, or the number of horses or pigs that can be grazed, then we are investing in a sure and sound proposition. I believe this to be possible at Coonalpyn. I have been surprised at the amount of grazing on certain small homestead paddocks of mine that have been regularly dressed with super for a number of years. At present they are a dense mat of trefoil and melilot, and since early June horses, cows, and pigs have been almost continuously grazing on them. These good results can be secured from the larger paddocks, especially where clovers are already well established." Quoting from a pamphlet issued by the Department of Agriculture of Victoria, Mr. Tregenza then made a summary of the points, worthy of consideration, to those who contemplated dressing pasture lands:—(*a*) Where the rainfall exceeds 20in. there will be a pronounced effect from dressings of 1cwt. upwards, but even in districts where the average fall is as low as 15in. very satisfactory results have been attained. (*b*) The stimulus to pastures has been so great that in many cases more than twice the number of stock have been carried and carried in better condition, and with an entire absence of "cripples" and deficiency diseases. (*c*) Because of the increased fertility and production land values have often doubled, and in many cases trebled. (*d*) Autumn applications are best—before the first heavy rains. An ordinary drill is generally used, the discs being raised off the ground where the surface is too rough and hard. One-horse fertiliser distributors can be obtained for £30 to £40, but they are not essential. (*e*) Quantity of super. The

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wetter districts require the heaviest dressings, but applications vary from 80lbs. to 2cwts. At Coonalpyn I should say from 80lbs. to 112lbs. of 36 per cent. to 38 per cent. super would be most suitable. For light land that is to be left out of crop for some years 1cwt. every two years is recommended. On heavy land clear of shoots that is to be left for grazing, it seems to me that the outlay on a 1cwt. application each autumn would be more than repaid in the increased net profits that would be received. (*f*) The super is used by plants as they require it and none of it is wasted. It will not wash out with floodwaters, and in droughty spells will continue to fertilise the grass so long as there is any moisture in the soil. Ordinary dressings of super will not blight off grass or crops in a dry year. (*g*) Top dressing improves the fertility of the soil by encouraging the spread of clovers. I have noticed, too, how the good grasses follow the super, particularly the clover family. It certainly stimulates the better grasses, with the effect of discouraging some of the useless weeds. The good effect upon the health and condition of stock by top dressing grass lands is one of the strongest points in favor of this practice. If phosphoric acid is lacking in the soil the feed will lack essential vitamines, and in consequence, stock, and particularly growing stock, will not thrive as they should.

YOUNGHUSBAND.

August 23rd.—Present: nine members.

ENSILAGE.—The following paper was read by Mr. F. Macrow:—"It is surprising to note that, although the first silo to be built in Australia was erected in South Australia, the farmers of this State are far behind those of Victoria and New South Wales in realising the importance of the silo as a means of conserving fodder. Ensilage making has now passed the experimental stage, and many farmers in all parts of the world rely almost entirely on ensilage for fodder, in times of drought. Ensilage stands alone as an insurance against drought, and in a district like this, where we have feed in abundance for a few months of the year and then practically nothing, I think no dairyman can afford to be without a silo. It supplies fodder that is most needed in the late summer and autumn, when a moist, juicy food is required to stimulate the milk flow of the cows. Lucerne rarely lasts long enough to carry on to the time when the natural feed is sufficient for the stock. For crops ensilage has many indisputable advantages over hay, the chief being its immunity from fire and vermin of any description. It will keep indefinitely without any depreciation in value, and is always ready for immediate use. It is a far more valuable fodder for milking cows than hay, because it has a favorable influence on the milk flow. The crop intended for ensilage is more easily secured than the hay crop, because it can be cut and carted straight to the silo in any sort of weather, whereas with hay there is the worry of getting suitable weather for cutting, stooking, carting, and stacking. The silo can be made in different ways and with different materials. Brick, stone, or concrete are generally considered the best materials to use, but wood or iron or even wattle and daub can be used. The latter, however, is not long lasting, and in using iron it is well to paint the inside with tar or whitewash to guard against the action of the acids in the ensilage. There are two kinds of silos—the overhead and the pit. The overhead is the more popular because of the ease with which it can be emptied, but I should much prefer the pit silo in this district, because the cost of excavation should not be great and there is not much danger of soakage in the sand. Also, the walls need not be so thick or well made and the pit can be easily filled. When butter is 2s. 6d. per lb., surely no one would mind the small amount of labor involved in getting a dozen bags a day from the pit. That would be enough for 24 cows. The main thing is to have the silo, when possible, much deeper than it is wide to help the material to settle down. It is also necessary to have the silo airtight, because the exclusion of air is the principle upon which the manufacture of ensilage is based. A silo 30ft. deep and 15ft. wide will hold about 100 tons of silage, and this would keep 30 cows for about six months; 20 cows would eat about 70 tons in the same time. This is feeding 30lbs. to 40lbs. per day per cow. It is better to have the corners rounded off in the silo in order to make it easier to tramp down and so make it airtight. Practically all green fodder can be successfully used as ensilage. The legumes, such as lucerne, &c., are not generally found so satisfactory as the others on account of unfavorable chemical changes due to the high nitrogen content, but mixed with other crops, such as wheat, barley, oats, rye, &c., they would give

good results. The last named cereals all make good silage. Maize is considered the best of all crops for ensilage, and sorghum, Sudan grass, &c., will also make good silage. Good mixed grasses also make excellent silage. During the filling of the silo the ensilage should be continuously tramped down and a sprinking of salt added to every foot or so of greenstuff is an advantage. Special care must be taken in tramping the edges and corners of the pit, for these are the parts where the air is most likely to gain an entrance, and if it does mould will result. When the silo is full it can be either sealed and weighted straight away or left for a few days to settle down, and then the top few inches, which will be found to be mouldy, can be taken away and the silo filled a foot or so higher than the top of the pit. The top is then covered with damp straw or chaff for about 9in. and then weighted with logs or old posts or stones. It is a good plan to cover the top with earth. The main object being to keep out the air, weighting is not so important. Cows should have about 30lbs. to 40lbs. per head per day, and a few pounds of oats added will make a balanced ration. When feeding cows it is as well to remember that ensilage taints milk, not through the cow, but through the air, so it is as well to feed it away from the cowshed or handle it carefully in the sheds. The best time to cut the cereals is a little before the time for hay cutting, or when the grain is in the milky stage. For maize it is a good plan to start cutting at the "doughy" stage. Lucerne and natural grasses should all be cut when flowering. The main point is not to cut before the full amount of nutriment can be obtained, nor too late when the crop is too dry. When using natural grasses or short lucerne it may be found more convenient to put the materials straight into the silo without chaffing, but care will have to be taken to tramp the greenstuff thoroughly, because it does not set down so easily as the chaffed material. With the other crops, and especially maize, it is much better to chaff the material, because of the ease with which it can be packed and removed from the silo. If the chaffcutter is placed next to the silo with the elevator leading into the middle, the material can be cut, carted, and chaffed straight into the pit, and the quicker the silo is filled the better.

BARMERA, August 28th.—The Superintendent of Experimental Work (Mr. W. J Spafford) attended the meeting and delivered an address, "Cultivation of the Soil." Mr. H. E. Levien also gave a short address, in which he dealt with the ploughing in of green crops.

BARMERA, September 24th.—Mr. H. T Levien, of the Berri Branch, attended the meeting and delivered an address, "Spraying." Mr. Wiltock also spoke on the advantage of using prepared spraying compounds.

BERRI, August 22nd.—The Deputy Horticultural Instructor and Manager of the Berri Orchard (Mr. C. G. Savage) attended the August meeting and delivered and address, "Manures." At a further meeting, held on September 26th, an article dealing with the subject, "Cultivation," was read by Mr. R. McCreanor, and an interesting discussion followed. A report of the proceedings of the Annual Congress was given by Mr. Ranford.

BORRIKA, September 15th.—Several matters of local interest were brought before the Branch, and an interesting discussion followed. Members also discussed the question, "Analyses of Fertilisers."

COOMANDOOK, September 19th.—Mr. Ninnes read a paper "Management of Sheep," and a paper dealing with the subject, "Conservation of Fodder," was contributed by Mr. Upton. The Hon. Secretary (Mr. M. P. Wilkin) read an article, "Painting." Interesting discussions followed the reading of the papers.

MARAMA, September 24th.—A member read the paper "Farm Management" that had been contributed to the Annual Congress, and an interesting discussion followed. Messrs. A. Greig and T. Hinkley gave a report of the proceedings of the Annual Congress.

PARILLA WELL, August 20th.—A paper dealing with the subject, "Tractor *v.* Horses," was read from the *Journal of Agriculture* by Mr. E. C. Slater, and an interesting discussion ensued.

WYNARKA, September 26th.—Fifteen members and one visitor attended the September meeting of the Wynarka Branch, when Mr. Hall read short papers dealing with the subjects, "Best Fence for the District, and "How to ell the Age of a Horse."

SOUTH AND HILLS DISTRICT.

CURRENCY CREEK.

August 24th.—Present: 16 members.

CLEARING HEAVY TIMBER WITH EXPLOSIVES.—The following paper was read by Mr. H. Higgins:—"The subject, 'Clearing Land,' can be divided into three branches:—(1) Clearing scrub land, *i.e.*, land covered with mallee, gum saplings, broom, yaccas, &c. (2) Clearing land timbered with trees varying in diameter from 4in. up to 10in. or 12in. at the base, and reaching to a height of 20ft., 30ft., or 40ft. (3) Clearing land of heavy timber ranging at the base from 12in. upwards; but more especially dealing with those around 2ft. and 3ft. at the ground line—and it is to this class that my remarks will apply chiefly. To deal with class 1—scrub clearing, &c.—one of the most important points to watch is the time of the year that the work is to be done. The farmer should start out on his block while he is still quite sure that he can fallow, and then thoroughly clear and fallow a strip of, say, 8ft. to 10ft. around the entire paddock to be used as a fire-break. He should then go through this scrub-land nicking the larger saplings, cutting down such trees as he thinks are too large for his roller. This he can do in the spring. Then having on hand a heavy wooden roller with strong iron cutters securely fastened to it, and a good team of eight to ten horses, or a powerful tractor, he can begin knocking down the scrub, bushes, &c., the roller breaking down or bruising the various shrubs and so making a good body of dry leaves for the fire to carry over later on. This rolled scrub should be exposed to the heat of summer until either February or March, depending in which part of the State. Here come the vital point—he will watch the weather for a suitable day, for on the quality of the burn he gets not only depends to a large extent the growth of his crop, but also a great saving in labor (if a good burn) in picking up sticks, &c., afterwards. Men who spend most of their lives out of doors can generally read the weather sufficiently well to know what kind of day the morrow will bring forth, and having formed his judgment, he will on the evening before burn back along his fire-break on the most dangerous spots so as to make things quite safe, for his main fire—which must be lighted on a hot, windy day—will be quite beyond control by the usual means of boughs, &c. With regard to class 2—timber varying from 4in. to approximately 12in. at the stump—it must be first ascertained to what use the land will be put when cleared. If for fruit culture I should recommend using a tree-puller for the larger trees, and for the smaller simply grub them out in the usual way. Here again the time of the year plays a most important part, and the work should be done after the winter has well set in and the earth has become thoroughly soaked. To attempt tree-pulling in the dry period means that a number of trees will snap off near the ground, and one's work of getting the butt out will be doubled. It is of the utmost importance for orchard work to get out the main strong roots, hence I suggest pulling rather than blasting. Should the owner intend sowing cereal crops, his cheapest method to follow would be to mullenise the smaller trees and shoot or pull the larger ones according to the time of the year. Once the timber is on the ground he can determine whether his distance to the railway, plus the cost of carting, will pay him for trucking the wood to the city. It can very easily not pay him, in spite of the high price paid by the consumer. In carrying out this work the farmer should especially see that all or any of his carting is done while the ground is hard. His best time probably would be to start clearing in the spring, and then by the time his wood was dry, summer would have begun, and both the carting and burning of tops would be made easy. If, however, only grazing of the land is sought, the only commercial way—because it is the cheapest—is to cut all small saplings and those only requiring a few axe-blows, say from 4in. to 7in. at the base, and ring-bark the balance, firing the whole paddock when the bark has begun to fall from the trunks. As a result, grass will appear after the first rain, and the carrying capacity of the land will be increased several hundred per cent. But to see so many thousands of blackened trunks on one's run is not a pretty site, and those who take pride in their holdings should try, when seasons are good, to get rid of these trunks as before described, because after the beneficial effect of the burn has been used up by the grasses, top-dressing will, in most cases, have to be resorted to. And now we come to class 3, which deals with the destruction, in many cases, of those grand old trees

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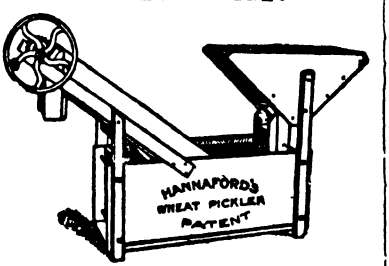
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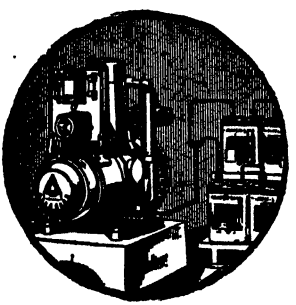


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which date back their birth to those dark ages of which so little is known. As an example of the age to which some of our trees can attain, it has been shown by experts of forestry that some of our red gums are well over 1,000 years old. These we can kill with an axe in an hour or render shapeless with explosives in less than half a day. To clear land on which is growing this large timber, the cheapest way that I have found is to ring the trees during the winter, making the ring-mark as low as one conveniently can, ringing deeply, so as to kill the tree at once. By March of the next year the tree will be dry, the bark falling off, and everything at its best for burning. One could begin earlier and to advantage where any large area is to be cleared, by making a substantial fire-break. It must be remembered that the burning must, if possible, be finished before the winter sets in. The first rain will not do much harm because the warm weather will soon dry any moisture out of the wood. The best auger to use for boring is a 1½in., and it must be in good condition. The explosive generally used is gelinite containing 50 per cent. nitro-glycerine. There are several other explosives on the market such as dynamite, monobel, &c., but not having used them I can make no comment, save that gelignite seems wonderfully safe and free from freak explosions; in fact, it appears almost impossible to explode unless with the aid of the right thing—the detonator. A party of three will begin the work—two borers and one charger, the latter carrying the gelignite, detonators, fuse, crimper, and rammer. This man should be one who is careful and methodical, and can keep his mind on his work, for it must be always remembered that if a premature explosion occurs it will probably prove fatal. The borers will run the holes (one hole to each tree) a little beyond the centre of the tree, in one of 2ft. to 3ft. diameter, and in those of larger size as deeply as the auger will permit, beginning the hole some 8in. to 10in. above the ground and running down to almost the level, but not below the ground line. The charger will then come along, and will estimate the number of plugs necessary for a successful blast. In this he will be greatly influenced by the class of tree—whether red, blue, or pink gum. I would here like to point out that the shorter the grain of the tree the less quantity of explosives necessary, red gum being one of the best, blue and manna gums the worst to shoot. Supposing we decide to blast a red gum of, say, 2ft. through, 4½ plugs will be sufficient. This charge will not usually blow the tree down, but it will so shatter the base that a fire will obtain a good hold, not only burning the tree down, but making a clean job of the stump. The charger will put the plugs in the hole in pairs (they fit nicely) and ram down tightly, the half plug he will save to receive the detonator. Having first cut, say, 1in. off the fuse to be sure of having the powder in good condition (the cut should be made square across), he will take a No. 6 detonator, slightly run the fuse into it until it stops, when the detonator must be crimped on to the fuse to keep them together. The crimping should be done by the open end of the detonator. Taking now the half plug, he will use the handle of the crimper and make a hole in the plug, which, being soft, is easily done; then lightly push the detonator and fuse into it; now lower it into the hole until it comes in contact with the other plugs, then pour in some soft earth, sand, or wood shavings from the auger, but keep out all stones. Gently press home with the rammer, but do not use force—it is unnecessary and extremely dangerous. The hole can now be quickly filled up, ramming lightly now and then until the opening is reached. Cut off the fuse about 2in. from the wood, and split it with a knife, exposing the powder. Everything is now ready for the explosion. Before going further, I want to emphasise the importance of careful handling of the detonators. They are really the only dangerous articles on the job. They contain a very powerful and extremely sensitive explosive which, on explosion, creates a pressure of eighty pounds to the square inch, so that if one did go off even without being attached to a plug, the unfortunate person holding it would require several fresh fingers at least. Now, as regards the cost of the above work, the gelignite, detonator, and fuse would cost approximately 7½d., and the time taken by men used to their work would be in the neighborhood of ten minutes for boring and charging. When compared with the time taken by the best axemen, based at the present rate of wage, the use of explosives stands out far ahead, and even if there were little difference in cost, the saving of time would still warrant the use of the explosives, for the men with explosives do more in one day than the axemen would do in one week. Luncheon and knock-off times are the best in which to fire the charges, for then the men, armed with torches, can

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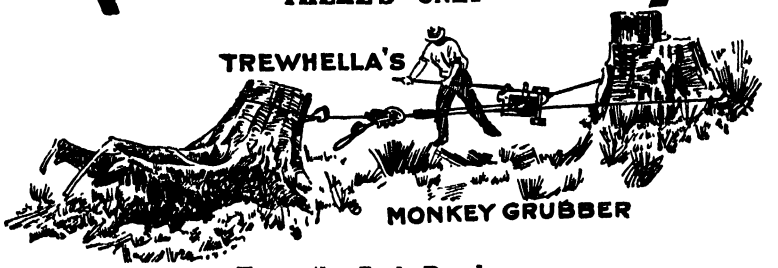
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begin on the lee side of the paddock firing two or three fuses before running for shelter. The shelter must be some good-sized tree, for the pieces of wood are blown out at terrific force, often travelling 200 yards from the scene of the explosion. One should never cut the time too short, but good fuse only burns at the rate of 3ft. in ninety seconds, and one will often be surprised at the time one will have to wait after having reached a shelter tree. Next day take a pair of good draught horses, a strong drag chain, and with the men go out to the paddock. There are almost certain to be sundry logs, limbs, &c., lying about amongst this class of timber, and these should be pulled up against the blasted butts, and if too long or heavy, cut in two with a crosscut saw. Should the day be suitable, with a fair wind, begin burning the heaps. It will not be long before your trees being falling, and the tops will need your attention, for no tree, however dry, will clean itself up. Two or three saw cuts will generally be found necessary, with a certain amount of axe work, before the whole tree can be burnt up cleanly, the horses pulling the heavier limbs against the butt. These fires should be looked to as often as possible, especially so before turning in for the night. Clearing this heavy timber must always be an expensive operation, even with the most up-to-date plant, but there is now on the market a machine which drives a saw by means of an engine, and this would greatly reduce the time taken in cutting up these trees. Anyone having much heavy timber to clear would be well advised to inquire into the costs, &c. In my remarks on blasting with gelignite, I have made no mention of firing charges by electricity, simply because for general work this method is unnecessary, but to those of my readers who want to remove huge trees of 4ft. or 6ft. in diameter at a moment's notice, so to speak, then boring a single hole into the trunk is practically useless, because sufficient explosive cannot be pushed into the hole near the centre of the tree to blow it down. The better way is to bore a series of holes at an equal distance from each other around the tree, charge all these, and fire by a battery, when the tree will be cut off as with an axe. Always bore the holes on the north-west side of the tree, because from that direction come the most suitable winds for burning. Although I have attempted to show those present the best way of clearing the land of timber, I cannot but feel that my paper would be incomplete if I did not lay stress on a point that is of national importance, namely, the wholesale destruction of good timbered trees, or what would eventually grow into such. Time after time we read articles in the paper by men who make a study of forestry, of a very probable world's shortage in several lines of timber within the next decade, and their remarks are but strengthened by our own observation in our own country, and even district. Already some of our most useful timbers are so scarce as to be practically off the market. I refer to that splendid tree called kauri pine, a wood searched after everywhere by boat builders or furniture makers. So also is the Huon pine, a name only to remember. Even in our very midst we find good splitting trees suitable for posts and sleepers or rails becoming scarcer and dearer as years go by, and if we only stop and look back about 15 or 20 years (a day when compared with the probable life of the world) we must realise that there will come a time, not very far ahead, when even firewood, let alone timbered trees, will be very dear. The man who looks no further than his paltry span of years is not only unbusinesslike, but he is not a true citizen to his country. And so I say of you who have no timber, plant clumps of trees which will serve as shade and shelter to your stock, and when you are gone they will have a commercial value for your descendants. And to those who are well favored in the way of trees I say clear by all means, thereby enriching yourself and your nation, but use the axe and firestick with discretion."

HARTLEY (Average annual rainfall, 15in. to 16in.).

July 25th.—Present: 17 members.

HARVESTER *v.* STRIPPER.—Mr. P. V. Paech, in the course of a paper dealing with this subject, said that the number of farmers using the harvester had greatly increased during the past few years, and that could be taken as a fair indication that gathering the crops with a harvester was superior to harvesting with a stripper and winnower. In a crop averaging 16bush. to 18bush. to the acre one man was able with the harvester to strip, clean, and bag from 60 bags to 70 bags per day, whilst the man using the reaper would only be able to strip that quantity of grain. Where the stripper was employed additional labor had to be engaged

for cleaning, and that at the present time entailed an expenditure of £4 10s. per week for each man. The speaker was of the opinion that a considerable improvement could be effected to the harvesters by simplifying the oiling of the machine. Some of the oil holes at the present time were placed in extremely awkward positions.

LONGWOOD (Average annual rainfall, 37in. to 38in.).

June 30th.—Present: 10 members and 12 visitors.

The monthly meeting of the Branch was held at the residence of Mr. W. Nicholls, and under the guidance of Mr. Nicholls members inspected the works of Kaolin, Limited. After tea, which was provided by Mrs. Nicholls, members proceeded to the Institute, where Mr. Joseph Johnson delivered a paper



entitled "Potato Growing." He introduced his subject by touching on the early history of the potato, its introduction into Europe and England more than 300 years ago—soon after which it became a main crop of commercial importance in Ireland. Continuing, he said the land on which it was intended to plant potatoes should be well tilled, but it should not be worked during the wet period of winter. The land should be well worked before planting, and it was better to delay planting, than to put the seed into an insufficiently prepared piece of ground. If the land was harrowed just as the potatoes were coming up, it would promote the growth of the crop, and destroy the weeds. With Pink Eyes, Up-to-Dates, No. 1 Carmens, and Delawares, the rows should be 2ft. apart with 1ft. between the setts. Snowflakes, Prolifics, and No. 2 Carmens required more room. The seed was often planted too closely, and better results would follow if more room were given. Early planting was recommended during the wet season, to a depth of not more than 3in., and later on from 4in. to 5in. deep. He strongly recommended banking the potatoes, first as a protection, and secondly as an advantage in digging. Cut setts gave the best results for spring planting. The size depends on the number of eyes. About a 2in. sett was sufficient, and two good eyes ample. With some varieties one eye was sufficient if well shot. If the seed was not ready for planting, it should be kept out of the ground until in the proper condition. Round seed saved from a poor crop should not be used. At all times a change of seed was advisable. There was a lot of difference between potato seed and seed pototoes. Seed potatoes were those saved from tubers that grow in the land. Potato seeds were found on the top and were only found in beds that had bloomed under favorable conditions. If greater care were taken of seed before planting, better results would follow. He was convinced that extra care and time devoted to the handling of the seed would result in a 25 per cent. increase in the crop. Seed should be secured a month or two before planting and placed on trays, and provided with plenty of ventilation. He recommended cool storage for seed for summer planting. By that method one was sure of the first shoot, which always gave the best result in wet or dry weather. Seed saved from a crop that was dug before it had reached maturity gave better results than that left in the land until all the tops had dried off. During summer, when taking seed out to plant, boxes should be used. The shoots would be saved, and heavier yields would be obtained. When the potatoes were planted 2ft. by 1ft., an average return of 1lb. per root would be equivalent to 8 tons per acre, and double that would be secured with good treatment. The time was not far distant when they would find it necessary to discover by analysis of soil what manures were required in the land. There was a disease known as "Scab," which he thought was caused by there being too great a supply of potash in the soil. Plants suitable for such soil were those that absorbed some of the supply of potash. Onions and tomatoes belong to this class. Manuring depended upon the previous crop. Where cabbage, cauliflower, lettuce, peas, and such like crops had been grown to perfection, very little manure would be required to grow a good crop, but it always paid to give a lighter dressing of potato manure. There was nothing to equal stable manure. If stable manure, bone dust, and ammonia had been used freely, a dressing of lime would give equal results instead of adding extra manure, because most of their land was deficient in lime. Lime was an essential plant food, and it had a very marked action upon the mechanical condition of the soil, making plant foods already in the soil available for use, thereby doing away with the need to some extent of adding further stores of plant food in the way of fertilisers. Lime would loosen heavy soil, and bind one of a sandy nature. It would make sweet an acid soil. Acidity was one of the troubles with new land. A liberal liming at the outset of operations opened a short cut to earlier returns. Lime also helped the warmth and moisture in the soil. It encouraged the activities of all of the nitrogen-gathering bacteria, and it brought about a rapid conversion of organic matter to humus, as well as counteracting the effects of excessive soluble salts. In renovating an old garden, an application of lime would do much to correct acidity and to counteract the evil of over-manuring, which condition often obtained when manures had been applied repeatedly each season until the soil became sick and sour. Lime should not be ploughed or dug into the soil, but spread on the surface and harrowed or cultivated into the land. The action of rain quickly carried it through to the lower soil. He

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only advocated the constant use of lime where manures had already been used. Lime should be applied to the land when it was being prepared for planting, not at the time of planting. Drainage was an important factor in the production of good potatoes. Where natural drainage was not present, it paid to resort to underground drains. Ploughed furrows, if used, should be at least 3ft. to 4ft. deep, whilst stones, where plentiful, answered very well. Clay pipes were the best, but were rather expensive. He had used slabs 18in. long, which made excellent drains. The drier the land was kept during the winter the better. It would retain the moisture better during spring, when the crop was growing. The paper then dealt with the dietetic value of the potato. A good discussion followed the reading of the paper, and many questions were answered by Mr. Johnson.

MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).

August 28th.—Present: nine members.

THE KED.—The following paper was read by Mr. E. Seager:—"The sheep tick (*Malophagus ovinus*), commonly known as 'The Ked,' is known to flockmasters throughout the sheep world. It prefers the British breeds of sheep and their crosses to the Merino. In biting the ked injects a fluid into the wound to prevent the blood from coagulating. This causes the sheep a great amount of irritation. With a small flock that one sees regularly one cannot remain long in ignorance of the presence of tick. The sheep will be noticed biting at their sides and rubbing against objects. Financial loss in not dipping infested sheep is chiefly brought about through the following:—(1) Loss of wool and mutton caused by the sheep falling off in condition; (2) loss caused by sheep tearing at sides; and (3) discoloration of the wool by the eggs of the tick. The female ked lays from three to five eggs, attaching them to the wool by a sticky substance emitted when the eggs are laid. When the eggs are laid they already contain living pupae, and in 21 days the ends of the eggs break of, the young emerge and commence their depredations on the sheep; in another 12 days the young ked is fully developed. The ked never voluntarily leaves its host, except to transfer to another sheep or lamb when the opportunity arises. In cold weather the ked lives close to the skin, but in warm weather it can be noticed sunning itself on the tip of the fleece. Should it become detached it seldom survives longer than four or five days. The true tick, when gorged, drops from the sheep to the ground, living apart from the host for long periods, during which it deposits its eggs and hatches out its young. Sheep should not be dipped immediately off shears, but should have sufficient wool on them to enable them to carry the dip in their fleeces for a considerable length of time, thereby preventing, to a great extent, the likelihood of reinfestation."

BALHANNAH, September 21st.—Mr. S. Cockburn contributed a paper, "Top Dressing Pastures," which provoked a keen discussion. The report of the delegates to the Annual Congress, Messrs. H. Bohme and G. Edwards, was received.

BLACKWOOD, August 20th.—The Field Officer of the Department of Agriculture (Mr. S. B. Opie) attended the meeting and delivered an address, "The Soil and its Cultivation."

CHERRY GARDENS, September 25th.—The Government Poultry Expert (Mr. D. F. Laurie) attended the meeting and delivered an address, "Egg Production and Marketing."

CYGNET RIVER, September 24th.—Articles dealing with the subjects "Law of Heredity," "In-breeding," and "Cross-breeding" were read by Mr. H. L. Moar. A report of the proceedings of the Annual Congress was also supplied by the delegates.

KANGARILLA, September 21st.—Mr. R. G. Morphett read a paper, "Conservation of Fodder Crops." He also gave a report on other subjects that were dealt with at the Annual Congress.

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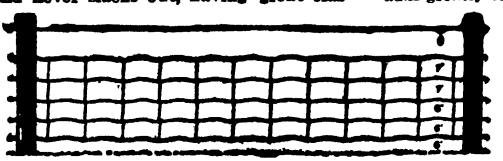


Fig. 7—Cyclone Special Spring Coil Sheep Fence.

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This is made for Sheep, Cattle, and all Stock, in various heights from 5 line (26 inches) to 12 line (58 inches).

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LONGWOOD, August 25th.—The monthly meeting of the Branch was held at Mr. A. Boyes's homestead. Members inspected the orchard where a pruning demonstration was given by Mr. Hughes. The meeting discussed the subject of the standard fruit case, and it was resolved "That in the event of an Act coming into force relating to the manufacture of fruit cases that it be made compulsory that all standard cases should be made with soft wood ends as an insurance against excessive shrinkage and warping."

McLAREN FLAT, September 6th.—The inaugural meeting of the McLaren Flat Branch was attended by the District Orchard Instructor and Inspector (Mr. C. H. Beaumont), and the Secretary of the Advisory Board (Mr. H. J. Finnis).

MOUNT PLEASANT, September 7th.—Mr. C. O. Royal read a paper, "The Care of Sheep," from the *Journal of Agriculture*. The discussion that followed centred around the point the correct time to commence shearing. It was generally agreed that an early start should be made in order to avoid trouble with grass seeds in the wool. The subject, "Summer Fodders," was also discussed. Mr. Royal spoke favorably of Sudan grass, and all members were of the opinion that summer fodder could be grown to advantage in the Mount Pleasant district.

MYPOLONGA, September 3rd.—Mr. E. Leishman (District Orchard Instructor and Inspector) attended the meeting and gave an address, "Spraying Fruit Trees and Vines."

SHOAL BAY, August 21st.—Mr. H. T. Noske read a paper, "How to Develop a Thousand Pound Cow," in which he took for the subject of his arguments the performances of a herd of Friesian cattle in Victoria.

SOUTH-EAST DISTRICT.

GLENCOE WEST (Average annual rainfall, 33.84in.).

August 24th.—Present: 11 members.

MAMMITIS.—Mr. A. von Duve, who read a paper dealing with this subject, said the complaint known as mammitis in dairy cattle was an inflammation of the mammary glands and as a rule occurred after calving. Probable causes of the trouble were injuries to the udder, retention of the milk for too long a period without being withdrawn, germs entering into the udder, exposure of the animal to cold and wet weather conditions, lying on wet ground, or the careless use of the milking tube. The type of mammitis that took on an inflammatory condition might be ushered in with shivers, which would be succeeded in a short time by fever and dulness. In milder forms of the disease those symptoms were absent, and only local symptoms in the udder were present. The udder became hot, hard, red, swollen, and sore to the touch. In bad cases the cow showed a distinct disinclination to being milked. The milk was often curdled and sometimes tinged with blood. For treatment Mr. von Duve recommended that first of all a good laxative should be administered—1lb. to 1½lbs. of Epsom salts and one tablespoonful of ginger in 3 pints of water, to be followed by ½oz. doses of saltpetre two or three times each day. In every severe case the speaker suggested the addition of from 15 to 20 drops of fluid extract of aconite and 10 drops of fluid extract of belladonna. The udder should then be fomented with hot water several times a day. After each fomentation the udder should be rubbed thoroughly with the following lotion:—Four tablespoonfuls of camphorated oil and one tablespoonful of turpentine. Several other remedies were suggested by the speaker. An interesting discussion followed, in which Messrs. Bonney, Tregenza, and Ferguson took part, the last mentioned speaker emphasising the necessity for isolating the cows that had the disease.

KALANGADOO (Average annual rainfall, 33in. to 34in.).

September 8th.—Present: 12 members.

CARE AND MANAGEMENT OF HORSES.—Mr. G. Bennett, who read a paper dealing with this subject, said the majority of farmers depended to such an extent on a team of horses as a means of gaining a livelihood, that it was most important that the animals should receive every care and attention. Under no circumstances should a team of draught horses be worked more than eight hours each day. He did not think any hard and fast rule could be laid down as to the quantity of feed that should be given each horse each day, but the teamster, by careful observation, would be able to tell the exact requirements of each animal in the team. Horses that were called upon to perform heavy work required good feed, and the farmer should reserve the best portions of the crop for the horses. From experience he had no hesitation in saying that the best plan for feeding the team was to tie up each horse in a separate stall. That would prevent the "boss" animals from disturbing the other horses. If the chaff was of the best quality he did not think any supplementary ration would be needed, but if the team was doing exceptionally arduous work, then the addition of oats or bran, or crushed barley, to the chaff would prove of benefit. A good supply of clean water was also essential to the good health of the horses. Special care should be taken in the selection of the collars. The collar should fit the horse fairly tightly, for he believed that 90 per cent. of the shoulder troubles were caused through ill fitting collars. He realised that with some horses it was almost impossible to keep their shoulders free from sores. Such animals the speaker thought the farmer would be well advised to sell. The team should be thoroughly groomed each morning before being harnessed, and the collars kept free from dirt, &c. In the discussion that followed, Mr. McKenzie doubted the advisability of giving the horses extra corn when they had heavy work to do, because, when the work eased up, the horses would not eat the ordinary feed.

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KALANGADOO (Average annual rainfall, 33in. to 34in.).

September 8th.—Present: six members.

CARE OF MILK AND CREAM.—Mrs. M. Evans, in the course of a paper dealing with this subject, said milk was one of the chief articles used in the preparation of various forms of food, and it was also most necessary to infant life. For those reasons it was essential that healthy cows should be kept, and cleanliness in handling the product observed. Mrs. Evans considered it advisable to pass the milk through a fine piece of muslin, in addition to the ordinary metal strainer. All vessels used for holding the milk should be kept thoroughly clean. The milk should be separated at the temperature at which it was taken from the cow. On no account should fresh cream be placed in the can with other cream until it was perfectly cold. The room used for storing the products of the dairy should not be used for the storage of vegetables or any article that would be liable to taint the cream, &c. The cream should always be covered with a clean piece of muslin or cheese cloth. In the summer it was a good plan to add one tablespoonful of salt to every gallon of cream in the can. Whenever fresh cream was added to the can, the whole of the contents should be thoroughly stirred. During very hot weather the can should be placed in a vessel containing cold water, which should be frequently changed, and the cream forwarded to the factory as often as possible. Butter should always be made from cream three to four days old. After the butter had been put through the churn, and the buttermilk well worked out, it should be washed in cold water, until the water came away quite clear. When the butter was very soft, it was a good plan to work in a small quantity of salt before washing was commenced. That helped to make a firmer product and assisted in getting out the butter milk. After the butter had been thoroughly washed and salted according to taste, every drop of water should be removed, because insufficient working caused streakiness and tended to make the butter rancid. If it was desired to keep the butter for some little time, it should be well washed and salted and left until the following day in bulk, when it could be worked up again and the water beaten out of it before being made into pounds. During very cold weather, it was a good plan to warm the cream before commencing churning, and if any difficulty was experienced in making it break into butter, a little hot water could be added. All churns or bowls in which the butter was prepared should be scalded with boiling water, and then rinsed out with cold water. Butter pats, scales, &c., should be scalded, rubbed with salt, and then rinsed in cold water. During the summer the butter would sometimes stick to the pats if the above suggestions had been followed, but that could be corrected by rubbing a little mustard into the articles and a subsequent rinsing would usually correct any trouble. In the discussion that followed, Mrs. Dowdell suggested the addition of a little borax to the butter in the summer to help harden it. Miss Tucker said the addition of a small quantity of carbonate of soda to milk and cream helped to preserve it during the hot weather.

MILLICENT (Average annual rainfall, 29.25in.).

September 1st.—Present: 12 members.

HARROWING GROWING CROPS.—The following paper was contributed by Mr. J. J. Mullins:—"The system of harrowing growing crops has been practised for a number of years. The benefits to be obtained are numerous, chief amongst them being the destruction of weeds and conservation of moisture, and in heavy land the harrowing has the effect of breaking the clods, especially if the land is worked after rain has fallen. As a rule, weeds are more easily destroyed than the barley plant, and this is due to the fact that the roots of the weeds are nearer the surface than those of the cereal. Whilst some of the barley plants will be pulled up by harrowing, it will be the weak and sickly plants, which, as a matter of fact, are better out of the land, for if they ever come to maturity they would yield but a poor return. Feeding off the crop is also practised to a considerable extent, but I do not think the benefits to the crop by this method are in any way comparable to those obtained from harrowing. The harrows should have sharp points on long, thin tynes, and the harrowing, to be effective, should be done after a rain and when the barley plant is firmly rooted and is from 4in. to 5in. high."

MOUNT GAMBIER (Average annual rainfall, 32in.).

September 8th.

QUALITY OF SOUTH-EASTERN ONIONS.—In the course of a short address, in which he commented on the quality of the onions grown in the Mount Gambier district, Mr. A. Kieselbach said good marketable bulbs commanded fair prices, but those grown at Mount Gambier were often a drug on the market because of their size, which ranged from that of a Barcelona nut to 4ozs. or 5ozs. In the Western district of Victoria the weight varied from 4ozs. to 12ozs., though the crop was often grown in inferior soil to that at Mount Gambier. The higher market value obtained for the better class bulbs offered ample inducement to growers to produce them. While in Victoria ordinary onions commanded £8 a ton and picklers £16, the opposite was the rule in the South-East. In their district picklers were regarded as rejects from the crop, whereas in reality they were a distinct variety, *i.e.*, Silverskins. Mr. Kieselbach attributed the inferior quality of local onions to the method of cultivation. The seeds were drilled instead of being planted, and as three or four seeds were dropped to every inch of the furrow the young plants were left without room to grow. The best and cheapest plan was to sow the seeds thinly, either in June or July, in a clean seed bed, leaving room for the plants to develop. The preliminary preparation of the proposed seed bed should be commenced during September, and when the weeds appeared the ground should be harrowed on a fine, dry day. The process should be repeated on several occasions until the bed was thoroughly prepared. The distribution of the young plants should be made in September or October, and the planting done in a 2in. furrow made by a hand plough. The young plants should be placed about 4in. apart and covered by raking back the earth thrown out by the plough. Weeding was obviated by that method, and every onion attained a marketable size, since it had every opportunity to reach maturity.

MOUNT GAMBIER (Average annual rainfall, 32in.).

September 9th.

CHOU MOELLIER.—Mr. E. W. Tollner gave an address on the growing of chou moellier as a fodder for the dairy herd. He had found that one acre should be planted for every three cows. Allowance had to be made for the time it took to be ready for "plucking"; the plant had to become possessed of a good stalk. If it was well looked after it could be made the main supply of fodder. It had been said that chou moellier tainted the milk, but he had taken particular notice of that as a director of a factory, and he was certain that cheese was not tainted by its use, and dairymen need have no apprehension on that score. However, butter might be different. During last year Prof. A. J. Perkins visited his farm and asked him to keep a record of the fodder taken from the crop. He ascertained that from four pluckings there was a yield of 16 tons of leaf to the acre. From the first plucking the yield was 6 tons, and the other three, taken during the dry times, had yielded 10 tons. When he pulled the stalks, all of which were fed to the herd, he kept a record of their weight, and found that they yielded 11 tons, making a total of 27 tons of fodder to the acre. He commenced to feed from the crop the first week in December, and it was not until August that the crop had been finished. The lucerne flea was a pest that had to be contended with. It ate the young plants, and in order to surmount that difficulty early planting was recommended. His dairy herd consisted of 16 cows, and he had a crop of 6 acres of chou moellier, which had yielded him 35 weeks of fodder, each cow having been fed 70lbs. a day. Considering the respective merits of Sudan grass and chou moellier, he had found that, whereas a Sudan grass crop was consumed in three weeks, with chou moellier there would be another crop ready in eight weeks from the time of the last plucking. He had planted last year in December, but this year he had been earlier, and the plants were doing well, and they would be fit to pluck much earlier than usual. He had found that with an earlier planting the young plants were not bothered with the lucerne flea, which was not about until the second plucking, when the plants were too hardy for the pest to be a nuisance. With his last crop he had used 380lbs. of super to the acre, or approximately 1 ton on the crop. That was a large amount, but he wanted to be assured of its being beneficial, and he had therefore used a greater quantity than was usually required. In caring for the plants after

sowing, weeds were difficult to eradicate, but that could be overcome by planting in such a way that there would be rows across and along the field, thereby simplifying cultivation. It was the usual practice to plant in rows 3ft. apart, with the plants a similar distance away, but he preferred adopting the plan of 3ft. apart for the rows and 2ft. 8in. for the plants. In that way 5,000 plants could be put in an acre. He always rolled the ground prior to planting, because he found that holes made with the "dibber" in the ground left uneven and loose by the scarifier invariably fell in, while the ground was firmer after rolling. The method he adopted in planting was for one man to go ahead making the holes and two men to plant. In that way 6,000 plants could be planted in a day. He always ploughed the land twice. If dairymen planted chou moellier they would find that the supply of milk would be sustained over a longer period. Of that he had ample proof, because for a short period he had had to stop feeding chou moellier and the supply went down considerably. Mr. J. Davidson said whenever he received milk from cows fed with chou moellier there was always a large return. He had even noticed that cows fed from the plants in the peaty soil at Allandale yielded good returns. Chou moellier lasted for eight months in the year, and was an excellent food when fed with hay and such like dry fodders. Mr. A. J. Hemmings said he had found that in the poor, sandy soil around Caroline it was better to plant the seeds instead of plants, and that should be done at the end of August or early in September. Another point was that the stalks could be pulled out and stacked somewhere, and it would be found that stock would eat them whenever they were fed to them. Mr. G. H. Kilsby, who had recently returned from a trip to Western Australia, read a paper, "Care of the Orchard."

PENOLA (Average annual rainfall, 26.78in.).

September 1st.—Present: 14 members.

CEREAL GROWING IN THE SOUTH-EAST.—In the course of a paper under the title of "Does Cereal Growing in the South-East Pay?" Mr. Hinze expressed the opinion that on a block of an area under 500 acres cereal crops could not be grown profitably in the South-Eastern districts. In the first place, the South-East was too wet and cold for the successful cultivation of wheat, and the weeds grew so rapidly that they choked the crop. Barley could be grown almost to perfection in the South-East, yet of late years, what with pinched grain and not very remunerative prices, the growing of barley had not been altogether satisfactory. Oats also gave very good returns, but the harvesting of that crop entailed a good deal of difficulty because of the rough weather that was frequently experienced. Sowing fodder for cows and sheep was a profitable undertaking, but hand feeding was most essential during the cold months of the year. He thought one of the best plans would be to sow 100 acres of different fodders, say, chou moellier and mangolds, every year for ewes and lambs. A good market could always be found for fat lambs. During the last six years the average price for lambs had been well over £1 per head, and the whole secret of success of fat lamb raising appeared to rest in seeing that the ewe was kept in good condition. It was in connection with the latter statement that the barley could be used to the most profitable advantage. Instead of harvesting the crops with the thresher or harvester they could be marketed through the sheep. Such crops, in conjunction with the natural pastures and good water, would enable the farm to show a good profit at the end of the year. The paper provoked a good discussion, the consensus of opinion being that farmers would be well advised to feed sheep and other livestock with barley and oats grown on the farm and market the cereals in the form of fat stock.

ALLANDALE EAST, September 21st.—Mr. S. Butler read a paper, "Farm Management," that had been read at the Annual Congress, and an interesting discussion followed. The report of the delegates to the Annual Congress was also received and discussed.

NARACOORTE, August 11th.—Mr. R. G. Lock read a lengthy and interesting paper, "Abnormal Milk and Cream," and a lively discussion followed. The Hon. Secretary (Mr. G. J. Turnbull) was presented with a travelling rug as a mark of appreciation of the valuable services he had rendered the Bureau.

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

No. 5. DECEMBER 15, 1923. VOL. XXVII.

Published Monthly by the Department of Agriculture.

Edited by H. J. FINNIS.

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JOHN COWAN,
Minister of Agriculture.

POINTS FOR PRODUCERS.

Pasture Plants at Mount Remarkable.

At the suggestion of the Department of Agriculture, one of the soldier settlers on the Mount Remarkable estate, Mr. Roy Treglown, tried on his hills block, a number of different pasture plants. Recently Mr. Treglown forwarded some specimens of these plants to the Department of Agriculture for the purpose of showing the growth made by Wimmera rye-grass, Subterranean clover and lucerne. The rye-grass was over 1ft. in height, which, for the first season's growth, was very satisfactory. The Subterranean clover had made plants 5ft. in diameter and another satisfactory feature was that it had seeded extremely well. Amongst the plants forwarded were specimens of cluster and hop clovers, which had made very strong growth on land that had been dressed with superphosphate.

The Agricultural Bureau.

During the year 1923, twelve country Conferences have been held under the auspices of the Agricultural Bureau of South Australia. An outstanding feature at these gatherings has been the remarkably good attendance of farmers, the most noteworthy instance being the Conference of Central Eyre's Peninsula Branches which was held at the Government Experimental Farm, Minnipa, in September, and which was attended by some 300 or 400 representatives from practically all parts of Eyre Peninsula. The usual plan on which these Conferences is arranged is for papers to be read by representatives of the Branches interested. These form the basis of discussions in which delegates and officers of the Department take part. An undoubted advantage associated with this is the fact that it enables the experts of the Agricultural Department to acquaint themselves with the precise nature of the problems that are confronting the farmers, and thus to supply just that information which should prove of most value. In addition, at these gatherings questions, previously submitted or impromptu, are replied to by the experts. The tenor of the discussions which have taken place at the Conferences held this year suggests that farmers generally are realising in increasing numbers the advantages associated with Conferences of this nature.

"Take-all."

Arrangements have been made by the Department of Agriculture for an exhaustive investigation of the "Take-all" problem in South Australia. The services of the lecturer in Plant Pathology of the Adelaide University (Mr. Geoffrey Samuel) have been requisitioned for the purpose, and this officer will devote practically the whole of his energies to the matter for some time. In pursuance of his inquiries, Mr. Samuel recently visited the Pinnaroo district. Through the courtesy of the local Branch of the Agricultural Bureau, who provided

him with transport facilities, Mr. Samuel was enabled to visit a large number of farms, inspect crops, collect samples, and investigate the disease generally in the field.

Value of Production.

The actual average net prices secured for sound and reject apples sold from the orchard after deducting all costs of cases, packing, and storage, except the labor of picking and grading, are as follows:—

Season.	Per case. s. d.
1918-19	5 6.27
1919-20	4 11.79
1920-21	5 7.47
1921-22	4 10.42
1922-23	4 7.77
Average for five years	5 1

On the basis of these figures, the average annual value per acre of 125 trees has been calculated for the different varieties as follows:—Cleopatra £36 10s. 2d.; Rokewood £23 6s. 8d.; Jonathan £21 5s.; Dunn's Seedling £20 15s. 1d.; Gravenstein £20 5s. 2d.; Rome Beauty £17 15s. 2d.; Scarlet Nonpareil £17 6s. 10; Ribston Pippin £16 5s.; King of Tompkins County £14 11s. 8d.

Fruit Growing at Kybybolite.

Mainly with a view to testing the possibilities of commercial apple growing in the district, an area of land at the Kybybolite Experimental Farm was planted to fruit trees in 1908. About 10 acres were put under apples and about one acre under mixed stone and pip fruits and vines. The great majority of the trees planted consisted of export apples of the three well-known kinds—Cleopatra, Jonathan, and Dunn's Seedling, and a few rows of Rokewood, Gravenstein, Ribston Pippin, King of the Tompkins County, Scarlet Nonpareil, and Rome Beauty were included. All the trees were planted 20ft. apart on the septuple system, and the rows of varieties were alternated, so that no two rows of any one variety are adjacent to each other. The Orchard has been surrounded by breakwinds of almonds on the north-west side, *Pinus insignis* on the south-west, and *Cupressus empervirens* (Cypress) on the north-east, and of these, the *Pinus insignis* has made the most effectual breakwind. In the first report on apple growing at Kybybolite Experimental Farm, the Manager (Mr. L. J. Cook) states that during the past five years, the average annual yield of the different varieties of apples has been as follows:—Cleopatra 63.4lbs.; Gravenstein 42.2lbs.; Dunn's Seedling 40lbs.; Jonathan 35.4lbs.; Rokewood 31.3lbs.; Ribston Pippin 27.3lbs.; Rome Beauty 26.6lbs.; King of Tompkins County 25lbs. ; Scarlet Nonpareil 24.9lbs. The Cleopatra variety stands out as the most prolific bearer, being the heaviest yielder in three out of five seasons under consideration, and

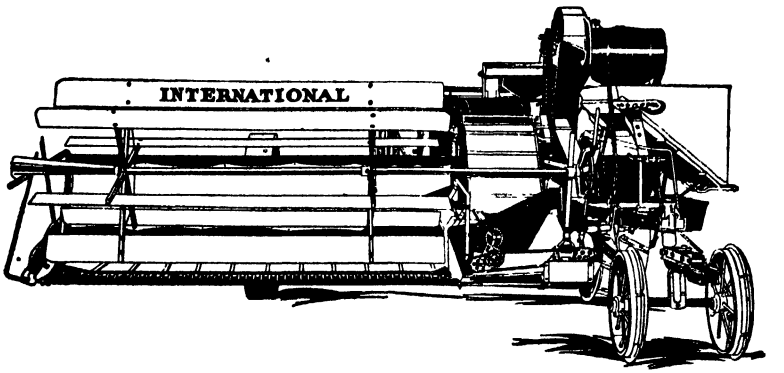
Gravenstein holds the pride of position in the other two seasons. The fact that the yearly average of Cleopatra has been half a case above any other variety, and also that over one-third of the orchard consists of this variety, has kept the average per tree of the whole orchard as high as 45lbs. per tree, which is above the average production of any other variety.

Manuring.

Tests designed to determine the effect of manuring apple trees have been carried on since 1914 with three varieties of apples, namely, Jonathan, Cleopatra, and Dunn's Seedling. Lime, superphosphate, potassium sulphate, and ammonium sulphate have been tried individually and in combination, and also farmyard manure and green manuring. In every case the returns secured show an increase over and above the cost of manuring. The value of the increase in the case of trees treated with 3lbs. superphosphate and 10lbs. lime was highest, namely, £13 12s. per acre; 3lbs. super. and 1½lbs. potassium sulphate per tree returned increase valued at £13 0s. 3d.; 3lbs. super. and 1lb. amm. sul. £12 18s. 11d.; 3lbs. super., 1lb. amm. sul., and 1½lbs. pot. sul. £11 3s. 1d.; 1cwt. farmyard manure £8 13.; 10lbs. lime £8 6s. 11d..; 3lbs. super., 1lb. amm. sul., 1½lbs. pot. sul., and 10lbs. lime £8 7s. 4d.; 1lb. super., ¼lb. amm. sul. £6 17s. 2d.; 1lb. super. £6 2s. 1d.; 3lbs. super. £5 13s. 4d.; 1½lbs. pot. sul., and 1lb. amm. sul. £5 0s. 5d.; 1lb. super., ¼lb. pot. sul., £4 13s. 9d.; green manure every two years £4 9s. 9d.; green manure and 10lbs. lime every two years £4 5s. 11d.; 1lb. super., ¼lb. pot. sul., and ¼lb. amm. sul. £2 10s. 2d.; ¼lb. pot. sul. and ¼lb. amm. sul. £1 14s. 7d., 1cwt. farmyard manure and 10lbs. lime £1 3s. 7d.

Sandy Soils in Wet Weather.

It is a matter of common experience that crops on sandy soil are poor in years of wet winters and frequently good in years of low rainfall. The usual explanation of these facts, the Director of Agriculture (Professor Arthur J. Perkins) recently informed a correspondent is as follows:—Sandy soils are exceptionally permeable and therefore, exposed to being leached of their soluble fertilising matter by heavy winter rains and the result is that in early spring their crops are unable to make the progress attained by those on heavier soils. Similarly, in dry years, sandy soils have the advantage from the fact that it takes far less water to saturate a sandy soil than to saturate one of heavier texture; for example, a fall of 10 to 20 points of rain might prove quite effective from the point of view of growth of plants on sandy soil, and be absolutely without results from the point of view of plants growing on a heavy soil. The main point is this, that the amount of moisture in soils available to plants is not determined absolutely by the amount of rain falling thereon, but rather by the excess of moisture in the soil over and above the quantity held firmly by the soil and beyond the immediate reach of the roots. In other words, again, sand



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which is not retentive of moisture, holds at the disposal of plants practically the whole of the moisture that reaches it; whilst heavy soils, on the other hand, that are retentive of moisture, only give up moisture to soils grudgingly and require, therefore, far heavier quantities of rain to produce good crops.

Director of Agriculture at Virginia.

Recently the Director of Agriculture (Professor A. J. Perkins) visited Virginia, and in company with Messrs. W. H. Land, R. Legoe, and J. A. Ryan, members of the local Branch of the Agricultural Bureau, inspected a number of farms in the District. On his return to Adelaide, Professor Perkins mentioned that this was essentially a hay growing district, and although the wet season had probably reduced the average yields of the fields, there were several fine crops to be seen, notably that of Messrs. Baker Bros., adjoining the railway station. "It is interesting to note," continued the Director, "that in this district the value of heavy dressings of phosphates is recognised, both from the point of view of heavy yields, and also from the viewpoint of the after effects on the grazing qualities of the land. One owner in the district, Mr. Baker, had dressed poor pasture land with super with very satisfactory results, and he expressed his intention of extending his operations in future years. Mr. Legoe has planted Virginia Park extensively with lucerne, and is carrying flocks which give every indication of being well fed and cared for." In the evening the Director addressed the members of the local Branch of the Agricultural Bureau on "Cereal Growing," dwelling chiefly on factors leading to maximum yields.

The Fruit Crop.

From officers stationed in various fruit districts, the Horticultural Instructor of the Deparment of Agriculture (Mr. Geo. Quinn) has received reports of the setting of the fruit crops. In general summary the text of these is to the effect that apples, although giving good promise in bloom, have only produced a setting which may be estimated as a fair average crop. Pears are generally reported to be setting well, particularly the Williams, or Bartlett variety. Peaches, however, are everywhere reported to have set very indifferently. Apricots promise to produce from one-quarter to one-third of the yield of last year, which in most localities was a record crop. The nature of the prospective plum yield is varying, some districts reporting a good setting of plums, but on the whole, the crop, particularly of the Japanese varieties, will be much lower than the average. All kinds of grapes are flowering profusely, the number of bunches being above the average, although generally speaking, the bunches appear to be smaller in size than usual with most varieties. Oranges have made a heavy setting, but of course, this is likely to be modified very considerably by the shedding of the small fruits. The various berry fruits give indications of good yields. Strawberries have set a large crop, but whether

the whole of the setting will be brought to maturity must depend almost wholly on the weather which prevails during the next few weeks. Up till the present it has been favorable. Cherries are only in moderate quantities, and the bird pest is making itself felt as soon as the faintest tinge of color begins to show on the early ripening varieties. A fairly heavy crop of loquats should be harvested and prices have been good. "One must infer from present conditions," continued Mr. Quinn, "that in-so-far as South Australia is concerned, prices for fruit marketed locally will tend to be fairly high, as it may always be assumed that when the first two or three kinds such as cherries, and apricots, are comparatively scarce, and prices consequently high, the kinds of fruit which follow in the order of ripening open at good market values."

The Effect of Weather on Fruit Trees.

The weather conditions prevailing during the past fortnight have resulted in a change for the better in the condition of most kinds of fruit trees. The rising temperatures resulted in healthier growth, but at the same time have revealed the fact that quite a number of fruit trees, particularly peaches, apricots, and almonds, have suffered severely through the excessive water in the soil during the long winter period. A fair number of the trees have started out into growth, but have died back and are shooting again from the more mature wood, and in the case of the orange trees they have in most plantations showed a decided tendency to become defoliated on the south-westerly side, a fact attributable to the extreme cold, squally weather, accompanied in many cases by hail storm. A continuation of the low temperatures into the spring months has been very conducive to the development of the fungus disease which causes curl leaf of the peach and nectarines, and many persons have expressed their doubts as to the effectiveness of spraying with copper and other compounds to prevent this disease. There is, however, abundant evidence available in many orchards in which the most susceptible varieties are grown, to indicate that a thorough and timely spraying according to the season, is a preventative of the disease. In respect to the trees that have died back, the suggestion is made by the Horticultural Instructor of the Department of Agriculture (Mr. Geo. Quinn) that no haste be displayed in cutting these back until there is evidence of an unmistakable character that the new growth starting lower down is making good; then the branches, limbs, or twigs, as the case may be, should be cut to where a start is being made. If large wounds are left, they should be covered over with lead paint and if the stems of the trees are much exposed to the sun and drying winds, it would be desirable to protect them with grass or bandages or whitewash until the new growth appears. It is very evident that these trees have lost portions of their root systems, and where a decline has not been too great, they will renew the root area, and in sympathy therewith, extend the top growth.

Yorke Peninsula Crops.

After having made a tour of practically the whole of the cereal growing portions of Yorke Peninsula during November, the Superintendent of Experimental Works (Mr. J. W. Spafford) remarked that the outstanding feature of the season in that area was the general excellence of the wheat and barley crops. Some of the crops were late, a fact due to the extreme wet in the early part of the season, but these crops were nevertheless, promising exceptional heavy returns.

Mount Gambier District.

On Friday November 30th last, the Mount Gambier Branch of the Agricultural Bureau made its annual tour of the district, in the course of which it visited a number of holdings and two butter and cheese factories in the neighborhood. Members of the Branch were accompanied by the Director of Agriculture (Professor Arthur J. Perkins), the Assistant Dairy Expert (Mr. H. J. Apps), the Field Officer for the South-East (Mr. E. S. Alcock), Orchard Instructor for the district (Mr. H. Orchard), and Representative Cameron, M.H.R. On his return to Adelaide, Professor Perkins mentioned that the district was looking exceptionally well and was carrying very good crops of barley and oats and even of wheat. There appeared to be more wheat sown in the district this year than usual, which was attributable to the unsatisfactory condition of the barley market during the last few years. In common with other parts of the South-East, landholders in this district were interesting themselves in Subterranean clover, which was extending naturally in some parts and was showing up well on what was previously fern land. Livestock in the district generally were looking well.

Combined Sprays.

As doubts are sometimes expressed by growers as to whether injury will result when lime sulphur and arsenate of lead are used as a combined spray, tests were conducted under the direction of the Horticultural Instructor (Mr. Geo. Quinn), during the month at the Government Experimental Orchard, Blackwood, to determine this point. The Manager (Mr. R. Fowler) reports that the results go to show that when carefully mixed, lime sulphur 1 in 70, with arsenate of lead added just before it is used, is a perfectly safe spray to apply, no injury resulting to the foliage or the fruit. Burgundy with arsenate of lead has also been reported as dangerous, owing to the liability of injury to the young fruits, but from tests made during the month, there appears to be no justification for supposing that this spray will cause the young fruits to fall off.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Replies supplied by ALAN H. ROBINS, B.V.Sc., Government Veterinary Officer.]

"J. P. S.," Tarcowie, has two-year-old filly with wound constantly breaking out above the hoof.

Reply—I suspect the presence of a stake or nail in the hoof causing formation of pus, which, following the line of least resistance, breaks out on the top of the hoof. I advise a very careful search of the sole of the affected foot for the purpose of ascertaining if a nail, &c., is buried in it, and, with this object in view, I advise paring the sole lightly with a hoof knife, and if this does not throw light on the cause, apply wide-mouthed pincers to the sole all round by squeezing, and if there is any particular part which on pressure causes the animal to flinch, search it carefully for the small black spots, which very often indicate pus, and require to be searched with sharp-pointed knife in order to allow the pus to escape. The filly, if unbroken, will have to be thrown for examination.

"A. R. H.," Lochiel, asks cure for "pink eyes" in sheep.

Reply—Have the following lotion made up and put a few drops of it into the eyes affected, two or three times a day:—Zinc sulphate, 2 drams; boracic acid, 1 dram; distilled water, 1 pint. If possible keep the affected sheep in a shady position so that the eyes are not exposed to the full rays of the sun.

"W. T. LeG.," Coomandook, has draught mare with swollen jaws. The neck is always turned to the right side, and when driven the animal turns around.

Reply—Your mare is suffering from a condition known as torticollis, and the exact cause may be one of several possibilities. It seems to me from the history you supply of the case that it is due to a partial dislocation of the neck bones. You should try to reduce the dislocation by trying forcible extension of the neck. Pass a stout rolled sack around the neck just behind the ears, attach a piece of rope to it, and get several people to pull on it so as to stretch the neck and at the same time pull it straight. While this is being done, press on the convex side of the neck at the spot where it protrudes most prominently so as to try to push the dislocated bones back into position.

"V. J. S.," Clarendon, reports cattle with hair falling off, leaving a dry scab on the skin.

Reply—Your cattle appears to be affected with ringworm. I recommend you to scrub the affected spots with some soapy antiseptic solution to clean off the scales. Then paint the spots over with tincture of iodine. Repeat these applications daily until you see new hairs beginning to grow on the patches, which event should begin to be noticed after a few applications of this dressing.

"A. G. T.," Glencoe West, has cow with teat cut with barb wire. Milk has to be drawn with the aid of a tube.

Reply—The difficulty in drawing milk through the affected teat is due to cicatricial contraction of the cut after healing. Forced dilation may be practised by using a small conical-shaped instrument known as teat dilator. If this is

passed up the teat two or three times prior to milking and the operation repeated for several days prior to each milking, very satisfactory results are often obtained. The only care necessary is to see that this instrument is kept scrupulously clean.

Hon. Secretary, Agricultural Bureau, Penola, forwarded formation found in sheep that had died from unknown condition.

Reply—The plant specimen is that of the commonly called "Salvation Jane," considered usually to have a fodder value in its young stages, though after it reaches the flowering and seeding stage it becomes tough and indigestible. The other specimens are what are commonly called "stomach balls," and they usually exist in sheep's stomachs without their presence being suspected until death occurs. They frequently cause no disturbance at all, but large numbers would set up serious digestive disturbances with possibly fatal results. The nucleus of these balls were on examination found to be small pieces of undigested stalk of the "Salvation Jane," so that feeding the stock on it has had much to do with bad results. These balls are gathered by the sheep nibbling leaves, &c., of indigestible fodder ravenously, or they may also form through swallowing of wool from sheep biting themselves or other sheep. To reduce the possibility of sheep becoming affected with these stomach balls, they should be given a plentiful supply of salt lick. This will aid their digestion, and they are not so prone to eat indigestible fodder, which they do in a search for salt for their system.

Hon. Secretary, Rapid Bay Agricultural Bureau, sent several inquiries.

Reply—1. *Re* lancing abscess. If you are certain it is an abscess, with the use of caution it could be lanced. 2. *Re* dipping of sheep. It would be better not to dip while mating. 3. *Re* sows farrowing dead litters. There would quite probably be some error in the feeding and management of the pregnant sows. Pregnant sows should have plenty of exercise, be kept undisturbed and contented. Anything likely to create alarm or undue excitement must be avoided. Furthermore, they must be well fed on good nitrogenous food so that the development of the unborn litter may receive no check. 4. Sow going off food and losing milk after farrowing. This is probably due to constipation. Avoid all foods likely to produce this condition, the aim being to provide food that will produce milk. Give her a dose of castor oil administered in warm milk, and feed sparingly but regularly on skim milk, barley, pollard, scraps, and green feed. Allow the sow to have daily exercise. Keep her warm, comfortable, and contented. 5. To get early lambs. The breeding ewes should be in good heart, sturdy, but not too fat at time of mating. The period of pregnancy in ewes is five months, and you can with this information, calculate for yourself what time to join up the rams with the ewes according to what time you desire to have the lambs dropped. The usual time to commence the mating is during the last week or two of the year onwards, so that the lambs begin to be dropped from the beginning of June.

"G. H. W.," Tarcowie, has pony which, after being driven a short distance, trembles violently and falls down.

Reply—The pony has evidently had two mild attacks of azoturia, which is usually associated with the causes of high feeding and irregular working. When not working it, you should restrict the diet and see that the animal gets plenty of daily exercise.

"W. B. P.." Edithburgh, has cow which can easily be milked up to a certain point, then she can only be stripped by squeezing the udder.

Reply—The udder of your cow is affected with a chronic fibrosis, as the result of which it has, to some extent, lost its normal elasticity, so that it will not milk right out like a normal udder. No treatment is likely to be of any avail. This condition may be due to chronic mastitis, acrimycosis, or tuberculosis.

"A. E.," Streaky Bay, reports blindness in a number of sheep.

Reply—The condition is a common ailment of sheep; contagious inflammation of the eye, from which there is a discharge and subsequently an opacity or cloudiness of the eye, which causes, more or less, temporary blindness. The same condition is sometimes caused by the presence of foreign bodies, such as grass seeds, dust, or any other irritating substances. The disease is a painful one, and the sheep will lose condition on this account and also because of their impaired vision and consequent inability to feed. Isolate those affected. Use the following lotion:—Sulphate of zinc, 16 grs.; tincture of opium, 3 drams; distilled water, 8ozs. Apply a few drops daily with an eyedropper.

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"A. J. C., ' Lake View, Stansbury, asks whether the plant known as "march mallow" is injurious to cattle.

Reply—It is definitely established that the feeding of the mallow to stock, horses, cattle, and sheep, and particularly young animals, will have injurious effects and produce definite symptoms of illness. Many feeding experiments have been conducted which successfully prove this fact.

"A. J.," Mindarie, has two-year-old cattle dog unable to hold food in the stomach.

Reply—Your dog is suffering from a chronic gastric catarrh, and it is possible that the primary cause of this may be tuberculosis. Regulate his diet, feeding twice daily on good wholesome food. Try the following medicine:—Glycerine of pepsin, 2 teaspoonfuls; acid hydrochlor dil., 5 drops; tinct. gentian, 1 teaspoonful; water, a tablespoonful. Give this immediately after feeding.

"Mrs. P. S.," Mount Barker, asks cure for scours in calves.

Reply—You must be thoroughly clean, use clean utensils, feed regularly, and not at irregular intervals, do not over-feed, and see that the feed is always given at blood temperature. A good ration is to feed warmed skim milk in which has been dissolved jelly made from whole linseed in the proportion of 1½ozs. of linseed jelly to 1gall of skim milk. To prepare the jelly, steep the seed in hot water for four or five hours, then put it on the fire and boil for 30 to 30 minutes to burst the seed. One teaspoonful of dried blood meal added to each feed is a very excellent remedy for calves suffering from scours, or if you cannot get this, you may try the following:—Brown a cupful of wheat flour, first mixing it with a little cold milk to prevent cooking, then stir it into hot milk and give to the calf rather warm. A teaspoonful of ground ginger might be added. Continue this feeding so long as there is any trouble, and after the scouring has stopped, give the flour without scorching for two or three days longer.

"S. Bros.," Yalmana, report foal three weeks old with the walls of both front feet almost vertical.

Reply—Your foal is apparently suffering from knuckling. You should try to lower the heels as much as possible by careful paring away of the horn with a foot knife, in order to try and bring the front wall of the hoof and the pastern more into a normal sloping position. If you can do this and let the foal have plenty of exercise the condition should gradually reduce itself.

"C. L. P.," Spalding, has horse six years old, hair falling off all over the body, and the skin is a mass of sores.

Reply—Your horse appears to be suffering from eczema; his blood is apparently in very bad order. Give him a good dose of physic, either an aloes ball or ol. lini., 1 to 1½ pints. Then for some time after that give him a handful (2ozs.) Epsom salts in damped feed night and morning. Put 1oz. of Fowler's solution in his drinking water daily for 10 days. Clean the skin of the body thoroughly by washing it with some soap and warm water and a little antiseptic added. Then apply two or three times a week to the skin a little of the following:—Boracic acid, 1 teaspoonful; bicarb. of soda, 1 teaspoonful; lard, 6ozs.; rubbing it in well.

"K. S.," Brentwood, has horse with badly swollen hind leg extending from the pastern to the hock.

Reply—Your horse is suffering from an attack of lymphangitis. Feed him on bran mashes for a day and then give a good dose of physic:—Aloes, 5 drams; calomel, ½ dram; nux vomica, 1 dram. Give him only bran mashes until the effect of the physic has worked off, and then keep him on light diet only; no corn. The swollen leg should be bandaged from the pastern up to the hock, putting it on fairly tightly and starting from the pastern and working up. Keep the bandage wet with cold water. After the soreness has disappeared give him regular exercise in order to make him use the leg.

Hon. Secretary, Agricultural Bureau, Wirrulla, asks the cause of horses eating the bark off mallee trees.

Reply—The horses are suffering from pica or chronic indigestion, which is caused by some error in their general management and dieting, and is usually manifested by this depraved appetite. They should be supplied with rock salt and whiting to lick, and particular care must be taken with their feeding. It may be necessary to give them a change of food.

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"J. H.," Harrogate, reports cow giving ropy milk from one teat.

Reply—The cow has mammitis, affecting that one quarter, and you will have to be very careful and clean in handling her to prevent the other quarters from becoming affected. Foment the udder frequently and strip out the affected quarter every hour if possible, destroying the curdled milk. The milk from the other quarters should be fit for consumption, but it should be boiled before being used.

HIGH OR LOW GRADE SUPERS.

Agricultural Bureau, Shoal Bay.—The Director of Agriculture (Professor A. J. Perkins) states:—"There is every advantage in using the high-grade 45 per cent. superphosphate, particularly on limestone soils. There is economy in transit costs in the first place and economy in unit price in the second. Thus, as an illustration, suppose a farmer was accustomed to dress his crops with 1cwt. of 36 per cent. super per acre and seeded annually 400 acres, this would mean he would have to purchase and convey over the railways 20 tons of super per annum. If he made use of 45 per cent. super the quantity would be reduced to 16 tons per annum, allowing for a mean dressing of 89lbs. per acre, which would be equivalent to 1cwt. of 36 per cent. super. Similarly, 20 tons of 36 per cent. super at 86s. would represent £86 sterling; 16 tons of 45 per cent. super at 100s. would represent £80 sterling."

BINDWEED.

"G. J. S.," Georgetown.—The Superintendent of Experimental Work (Mr. W. J. Spafford) says:—"Bindweed, or convolvulus, when once established, is extremely difficult to eradicate, and the only way I have seen it controlled is by enclosing the affected area with a good sheep-proof fence and 'dry' feeding sheep in the fenced-off plot. If the block of land carrying this very bad weed is only small, surround it with a good fence, provide a water trough, and enclose a few wethers on it and feed them on cereal hay. You will need to keep sheep on the plot for at least 12 months, and possibly for 18 months, but providing that the block is not far from your homestead so that it is not too much trouble to feed and water the sheep regularly, you will not lose much on the transaction, particularly if meat and wool keep up in price. You will either keep some of your ration sheep on the plot or else fatten a number of small lots of wethers for sale, and for the purpose you will need to provide 2lbs. of hay per sheep per day throughout the year. If you leave the same sheep on the plot the whole time, and just take off their wool, it would be better to build a straw stack in the fenced-off area, and provide the sheep with a little grain each day (say, ½lb. to ¾lb. per head) or about 1lb. of hay per sheep per day."

BUNT AND FLAG SMUT.

Yadnarie Agricultural Bureau.—The Director of Agriculture (Professor A. J. Perkins) replies:—"There is no necessary connection between 'bunt' in wheat and 'flag smut' (so-called black rust); indeed, there is a vital difference between the two from the point of view of infection. Infection in the case of 'bunt' comes almost exclusively through the seed, whereas in the case of 'flag smut' infection is almost invariably from the soil. It cannot, therefore, be said that conditions which favor the development of 'flag smut' necessarily favor the development of 'bunt.'"

SAND DRIFT.

"S. M.," Millicent, seeks information respecting a grass to stop sand drift.

The Superintendent of Experimental Work (Mr. W. J. Spafford) replies:—"Where sand drifts very badly, so that 'craters' or 'blow-outs' are formed, or when a big mass of sand continues to move each time that it gets dry, the growing of Marram grass has been the most effective means yet used to control it, and this grass will do the work in any district receiving on the average at least 20in. of rain annually. The area to be planted with Marram grass should be handled somewhat as follows:—1. It must be fenced off so that livestock and rabbits do not gain access to it. 2. Rooted sections must be transplanted in rows about 6ft. apart, the plants being about 2ft. apart in the rows. 3. Each clump of grass planted should be of such a size that the stems when grasped by the hand should form a 'hand-full.' 4. When planting, the rooted plants must not be cut, but

should retain all of the growth as received from the supplier. 5. The direction of the rows should be as much as possible across the line of the most prevalent winds, so this direction has to be altered according to the lay of the land, and in some blocks the direction for the rows is continually changing, whilst in others the rows will be more or less semi-circular. 6. The depth of planting varies according to conditions; in sand drifting at the time of planting the plants will need to be put in holes 15in. deep, but if the sand is not likely to move again for a few months about 9in. is deep enough for planting. 7. After the plant is put in the hole the sand should be firmly compacted around it by tramping or ramming. 8. Planted at the spacings mentioned will mean 3,630 'plants' per acre, and 1 ton of grass consists of about 2,800 'plants' of a size that a man can conveniently hold in his hand. 9. Plant Marram grass from May to August. 10. After the second year the grass can be grazed, but this grazing must be done carefully so as not to thin out the grass and again start the drift, and livestock should only be turned on the area when there is a lot of growth, and never when the grass is low. 11. The borough of Port Fairy, Victoria, will supply plants and give you much useful information.

"If the sand drift you wish to control is not a very bad one, the Buffalo grass used in lawns will hold the sand well and provide you with really good grazing, both as to quantity and quality. This grass should be planted during the period August to October as follows:—(*a*) Fence off the area to keep livestock and rabbits outside. (*b*) Put rooted sections of Buffalo grass 4in. to 6in. deep, about 3ft. apart each way. (*c*) Tightly compact the land around each plant. (*d*) If the land has been cultivated the 'plants' can be sown in plough furrows, being careful to roll the land after planting. (*e*) Once established this grass will provide much grazing, but livestock must not be left on it for long periods; rapid feeding, then removal of stock is the best way to handle a sand-holder. (*f*) A dressing of 1cwt. superphosphate per acre will increase the grazing capacity very considerably."

FOOT ROT.

"A. T. C.," Arno Bay, forwarded specimens of diseased wheat plants which were examined by the Lecturer in Plant Pathology (Mr. Geoffrey Samuel), who states that the wheat forwarded was affected by the "foot rot" fungus, *Helminthosporium*. A description of the disease is to be found in the New South Wales *Agricultural Gazette*, XXXIII., 13-19, where the writer considers that it sometimes does more damage than take-all. Control methods at present known are the same as for the latter well-known disease (burn stubble, early fallow, clean fallow, good compact seed-bed, good dressing of super). The disease may be expected to be worse in wet seasons. Affecting scattered plants more, it is not so obvious as take-all, and more of it may be present in the State than is suspected.

SITKA SPRUCE.

Longwood Agricultural Bureau desire to know whether the American Sitka spruce would be a suitable timber to grow in cold and wet localities of the Adelaide hills.

The Conservator of Forests (Mr. Walter Gill) says that the Sitka spruce (*Picea sitchensis*) may do fairly well in the Adelaide hills where the rainfall is heaviest, and the land sufficiently drained; but it is not likely to attain the fine dimensions which it reaches in Alaska, where snow prevails for a considerable part of the year.

OIDIUM.

"C. H. N.," Langhorne's Creek, sought information respecting the use of lime and sulphur as a means of controlling oidium. Some large berries on vines treated cracked.

The Horticultural Instructor (Mr. Geo. Quinn) says the use of a mixture of powdered lime and flowers of sulphur has been advocated for many years as a remedy against the powdery mildew (oidium) of the grape vine. The reason why the larger berries cracked would most probably be found in the fact that they, having thinner skins, would have received greater injury from the oidium prior to the dusting. The dusting of a mixture of air-slaked lime and sulphur would not cause the skins of healthy grapes to crack.

WHITE CLOVER.

"A. T. McE.," Jamestown, seeks information respecting white clover.

The Superintendent of Experimental Work (Mr. W. J. Spafford) says:—"White clover is a plant which grows in wet situations, and if it is to be grown on land with good drainage or on land which is dry in the summer, it must receive plenty of irrigation water. The seed can be sown either in the autumn (March and April) or in the spring (September and October)."

CATERPILLAR ATTACK OF GRAPE VINES.

"T. J. F.," Lucindale, is troubled by a caterpillar which he reports eats the young leaves of his grape vines.

The Horticultural Instructor (Mr. Geo. Quinn) advises him to spray the foliage of the vines thoroughly with arsenate of lead, using it at the rate of 1oz. in 1½galls. of water, if it is bought in the powdered form, but if as paste, 1oz. in ½gall. of water.

POULTRY LICE.

Big Swamp Agricultural Bureau.—The Poultry Expert (Mr. D. F. Laurie) states that poultry lice (parasites) are of two kinds as regards habits, viz., those which live permanently on the birds and those which infest the crevices, &c., of a poultry-house and under the loose bark of trees. Those on the body may be destroyed by dusting the birds with a good insect powder, taking care that the powder reaches the skin. Another remedy is to dip in Cooper's sheep dip, half strength, choosing the morning of a warm day. Parasites in the poultry-houses, red mites, and ticks are destroyed by abolishing all unnecessary wood-work and old box nests and saturating the building with kerosene, repeating at intervals throughout the summer.

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REPORT ON THE FIRST YEAR OF OPERATIONS OF THE MOUNT GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

[By ARTHUR J. PERKINS, Director of Agriculture.]

Mount Gambier and Moorak dairymen joined together last year and formed the second Herd Testing Society in South Australia. They commenced operations on the 1st of August, 1922, under the name of Mount Gambier and District Herd Testing Association. The first year of operations closed, therefore, on the 31st of July last, and I submit herewith a general report on the same.

1922-23 COMBINED ASSOCIATION RESULTS.

General returns from all herds in the Association are shown in summary in Table I. below:—

TABLE I.—*Showing Combined Results of Mount Gambier and District Herd Testing Association for* 1922-23.

Month. 1922-23.	Average Cows Under Test. Cows.	Average Cows in Milk. Cows.	Average Butter-fat Test. Per cent.	Milk Produced by Assocn. Lbs.	Milk per Cow. Lbs.	Butterfat Produced by Assocn. Lbs.	Butterfat Per Cow. Lbs.
August	383.2	282.3	4.13	223,861	584.2	9,245.0	24.1
September	369.9	315.0	4.05	257,823	697.0	10,435.5	28.2
October	377.8	334.0	4.24	279,051	738.6	11,829.2	31.3
November	382.5	351.8	4.01	269,710	705.1	10,806.7	28.3
December	380.0	359.9	4.36	215.488	567.0	9,391.9	24.7
January	376.5	321.2	4.22	176,159	467.8	7,429.0	19.7
February	375.8	298.0	4.33	125,064	332.8	5,409.5	14.4
March	308.6	234.7	4.48	96,953	314.2	4,339.2	14.1
April	304.2	205.1	4.64	64,722	212.8	3,001.6	9.9
May	299.4	165.9	4.52	58,837	196.5	2,663.7	8.9
June	294.4	146.1	4.21	55,364	188.1	2,330.8	7.9
July	288.2	160.2	4.00	78,060	270.9	3,119.3	10.8
Means	345.0	264.5	4.21	—	5,509.8	—	231.9
Total production for year				1,901,092 lbs. milk.		80,001.3 lbs. butterfat.	

Outstanding features in these results may be summarised as follows:

1. The mean number of cows under test for 12 months was 345.

2. The mean number of cows in milk over the same period was 264.5, or 76.7 per cent of the total number of cows in the herds. This represents a mean milking period of 280 days in 12 months.

3. The mean output of milk per cow per annum was represented by 551galls., or 1.97galls. per day over the mean milking period of 280 days, or 1.51galls. per day over full period of 12 months.

4. The mean butter fat test was 4.21 per cent.

5. The mean output of butter fat per cow per annum was represented by 231.9lbs., or 0.83lbs. per day over the mean milking period of 280 days, or 0.64lbs. per day over the full period of 12 months.

6. On the basis of a 15 per cent. over-run, this would represent 266.68lbs. of butter per cow per annum, or 6¾lbs. of butter per week over the mean milking period of 280 days, or 5 1-10lbs. of butter per week over the full 12 months.

7. Mean milk yields per cow were fairly heavy in spring and early summer, reaching a maximum of 73.86galls. per cow in October. From December onwards supplies declined rapidly, reaching a minimum of 18.81galls. per cow in June. It is clear that adequate feeding was not provided when the flush of spring supplies was over. It is probable, too, that effective shelter was lacking during the bleak wet winter months.

8. Butter fat production per cow has followed somewhat similar lines. Maximum production per cow was registered in October, 31.3lbs., and minimum in June, 7.9lbs.

COMPARISON WITH MURRAY BRIDGE HERD TESTING RESULTS.

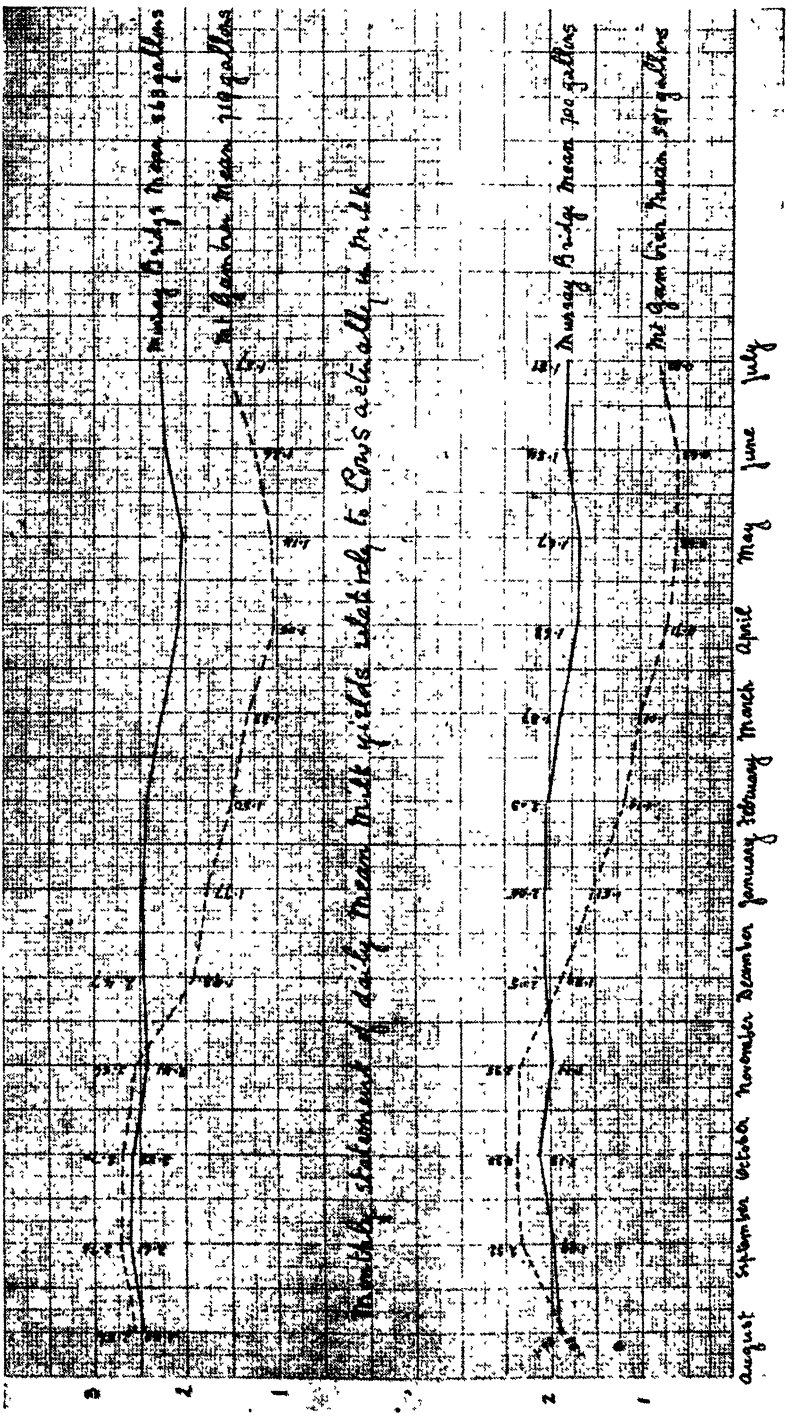
Without in any way desiring to minimise the results secured at Mount Gambier, I think it necessary to contrast them with similar results secured elsewhere. I realise, of course, that climate and local conditions generally must be taken into consideration in any such comparison. Nevertheless, I take it that this comparison should have a stimulating influence on the district, since it is certain that Mount Gambier dairymen could do very much better than they have done over the relatively lean portions of the year.

Outstanding points of comparison have been summarised in Table II.

TABLE II.—*Mount Gambier and District General Results* (*1st year*) *Contrasted with those of River Murray* (*1st and 2nd year*)

	Mt. Gambier and District.	River Murray.	
	1st Year.	1st Year.	2nd Year.
Mean number of cows in herds	345	306	291
Mean percentage of cows in milk	76.7	83.9	81.1
Mean milking period (days)	280	306	296
Mean 12 months' output of milk (galls.)	551	685	700
Mean butterfat test (per cent.)	4.21	4.36	4.38
Mean 12 months' output of butterfat (lbs.)	231.9	298.6	306.3
Estimated weekly production of butterfat over 12 months	5.13	6.59	6.76

It will be observed that from the point of view of combined herds, the results are all in favor of the River Murray Herd Testing Association. It should not, however, be assumed that this is wholly the natural consequence of more favorable conditions. We shall indeed



Monthly Statement of Daily Mean Milk Yield relatively to all Cows in Herds whether Dry or in Milk.

have occasion to note later that the records of some of the Mount Gambier Herds are exceedingly meritorious: and it follows that if the mean results of the Mount Gambier herds are appreciably below those of the River Murray, it is largely because of certain defects in practice which it should be possible to correct. Indeed, this I take to be one of the main purposes of Herd Testing Associations.

One outstanding feature leading to reduced yields, is the fact that the mean number of days cows continued in milk was greater on the River Murray—306 and 296 respectively—than at Mount Gambier—280 days. This may be the consequence of the type of cow kept, or a matter of management: I suspect the latter. In order to make clear the main lines of weakness, I have analysed the position month by month, as indicated in Table III.

TABLE III.—*Showing Month by Month Mean Percentage of Cows in Milk, and Mean Daily Yield of Milk Relatively (a) to Total Cows in Herds, and (b) to Cows Actually in Milk (Mount Gambier and District).*

	Percentage of Cows in Milk.	Mean Milk Yields per Day Relatively to	
		Cows in Herd.	Cows in Milk.
	Per Cent.	Galls.	Galls.
August	73.7	1.88	2.56
September	85.2	2.32	2.73
October	88.4	2.38	2.70
November	92.0	2.35	2.56
December	94.7	1.83	1.93
January	85.3	1.51	1.77
February	79.3	1.19	1.50
March	76.1	1.01	1.33
April	67.4	0.71	1.05
May	55.4	0.63	1.14
June	49.6	0.63	1.26
July	55.6	0.87	1.57

It can be seen that from April to August milk production was at a very low ebb: and in spite of relatively high output from August to December, the total for the year is far from satisfactory.

I have endeavoured to illustrate this point graphically in comparison with the second year results of the River Murray Herd Testing Association. It will be noted how steady was the production of the Murray Bridge herds from one end of the season to the other; a clear indication of good consistent feeding. And notwithstanding the fact that mean production was heavier at Mount Gambier from August to November, the mean output for the year was 700galls. on the River, and only 551galls. at Mount Gambier. I am forced to the conclusion, therefore, that Mount Gambier herds have been insufficiently fed over the bulk of the year, and have probably suffered from undue exposure during bleak winter months.

PERFORMANCES OF INDIVIDUAL HERDS.

We may now pass on to a consideration of returns from the point of view of individual herds: these have been summarised in Table IV.

TABLE IV.—*Showing Individual Results of Mount Gambier Herds in 1922-23 Season.*

Herd.	Period Under Test. Months.	Mean Cows in Herd.	Mean Cows in Milk.	Milk. Total Lbs.	Milk. Per Cow. Lbs.	Mean Butterfat Test. Per cent.	Butterfat. Total Lbs.	Butterfat. Per Cow. Lbs.
2/R . .	12	15.8	13.6	138,737	8,792.7	4.39	6,085.5	385.8
2/J . .	12	12.4	10.5	93,929.5	7,389.3	4.32	4,040.7	318.6
2/E . .	12	11.1	9.3	72,286	6,461.3	4.41	3,190.6	285.3
2/K . .	12	20.2	16.3	124,223	6,117.8	4.28	5,307.1	261.3
2/C . .	12	20.3	17.0	132,213	6,400.0	4.00	5,286.1	255.5
2/F .	12	20.0	15.0	111,416	5,570.8	4.13	4,597.6	229.9
2/I . .	12	14.3	10.7	81,408	5,520.0	4.12	3,357.7	227.8
2/H . .	12	26.7	21.7	144.975.5	5,322.0	4.17	6,052.2	222.1
2/L . .	12	32.3	24.6	148,834	4,554.4	4.56	6.785.3	207.7
2/A .	12	20.2	14.7	95,053.5	4,818.9	4.30	4,088.8	207.1
2/D . .	12	13.5	9.5	64,282.5	4,726.6	4.00	2,568.3	188.7
2/Q . .	12	33.0	21.7	149,690	4,536.0	4.10	6,135.0	185.9
2/O . .	12	41.7	29.8	179,917	4,204.3	4.07	7,316.4	170.8
2/N . .	12	13.9	9.8	54,568.5	3,719.9	4.05	2,210.1	150.9
2/B . .	12	7.0	5.5	60,379.5	8,635.1	4.17	2,519.5	360.3
2/G .	12	2.8	2.6	23,768	8,751.2	4.54	1,079.6	395.0
2/M . .	7	65.9	53.7	217,214.5	3,294.5	4.17	9,045.9	137.3
2/P .	1	15.0	12.6	8,196.5	546.3	4.09	335.0	22.2
Means .	11.1	20.7	15.9	—	5,509.8	4.21	—	231.9
Total production for year .				1,901,092 lbs. milk.			80,001.3 lbs. butterfat.	

Three prizes are offered annually by Government with the stipulation that cows under test must not be less than 10 in each winning herd, and that the mean butter fat output per cow per annum in each winning herd shall be not less that 300lbs. per cow per annum. It follows that Herd 2/G (2.8 cows) and Herd 2/B (7 cows), the yearly outputs from which were highly satisfactory, could not compete. Unfortunately, two other herds only exceeded the 300lbs. mark, and were awarded respectively first and second prizes. These herds were:—

First Prize, £75—Herd 2/R (Mr. E. Tollner), 879.27galls. of milk, and 385.81lbs. of butter fat per cow per annum.

Second Prize, £25—Herd 2/J (Messrs. J. L. Heaver & Son), 738.93galls. of milk, and 318.55lbs. of butter fat per cow per annum.

The results secured by the winning herds compare very favorably with those secured by the best herds of the River Murray Herd Testing Association. Indeed, Mr. Tollner's mean yield of butter fat—385.81lbs.—exceeds Mr. Halliday's best record by over 16½lbs. This is clear proof, if any were needed, that Mount Gambier conditions do not necessarily imply a relatively low milk output. In the circumstances, a close analysis of Mr. Tollner's results is well worth while.

HERD 2/R (MR. E. W. TOLLNER).

The Assistant Dairy Expert (Mr. H. J. Apps) reported as follows on Mr. Tollner's Herd at the conclusion of the first year of operations of the Herd Testing Association:—

"The 16 members of this herd consists of crosses and grades of Jersey, Ayrshire, and Shorthorn blood. The general type of this herd is somewhat irregular, but 10 of them are of nice conformation, and all of the cows are in splendid milking condition, which is so essential with good dairy cows, and reflects great credit on the owner, showing that they have been extremely well cared for. An inspection of this herd at this period of the year is well worth a visit by other members of the Society. The herd bull is an Ayrshire."

The herd consisted of:—

Cows on their first calf	2
4 years old	2
5 years old	3
Aged	14
Total,	21

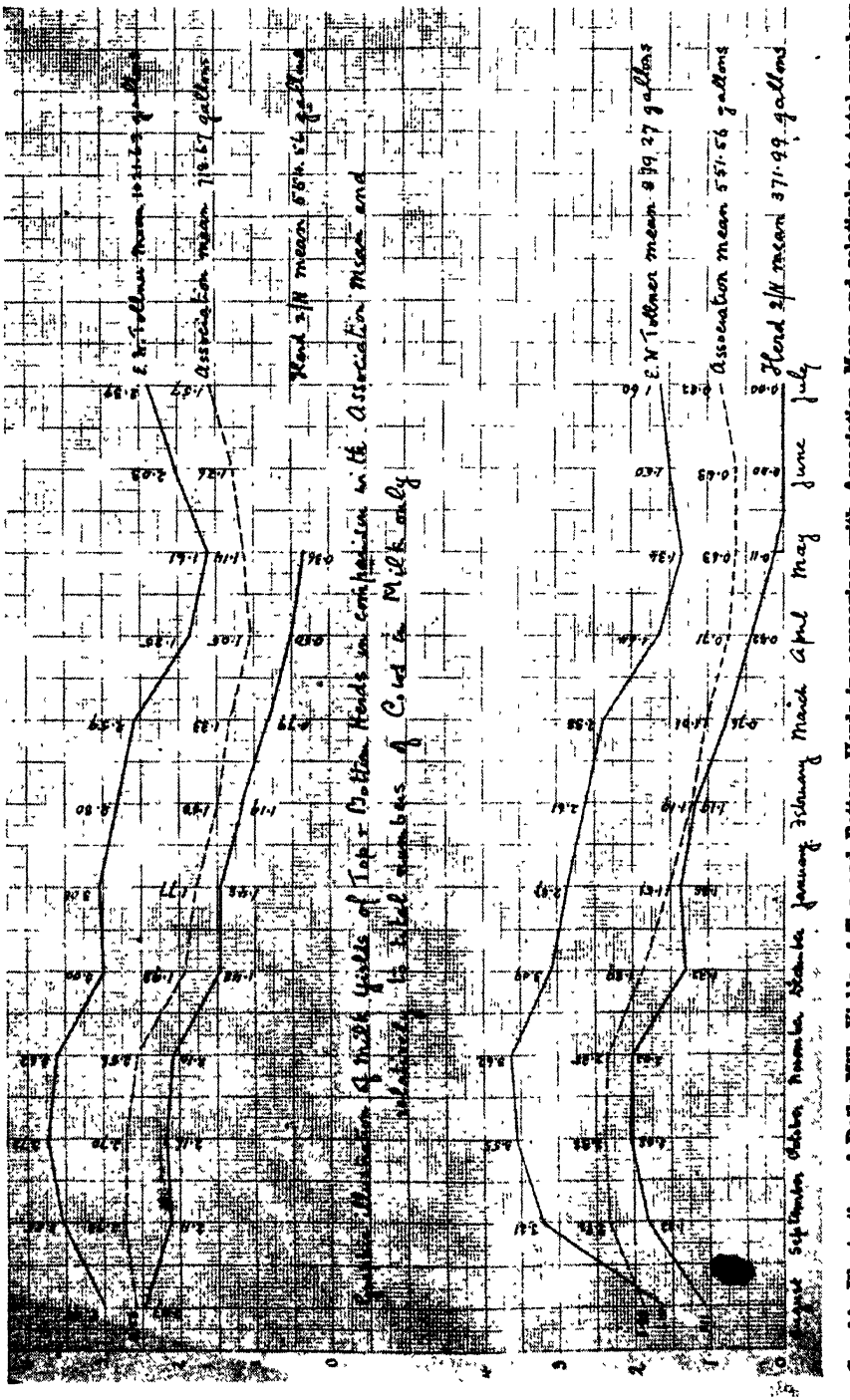
In order to make clear how meritorious were the performances of Mr. Tollner's herd, I shall contrast them in summary with those of the Association as a whole, and those of Herd 2/N at the bottom of the list:—

TABLE V.—*Contrasting Performances of Mr. Tollner's Herd with those of the Association as a Whole, and of Herd* 2/N.

	Mr. Tollner's Herd.	Association Combined Herds.	Herd 2/N.
Mean number of cows in herd	15.84	345.04	13.92
Mean number of cows in milk	13.58	264.53	9.84
Percentage of cows in milk	85.73	76.67	70.69
Mean milking period (days)	313	280	258
Mean milk per cow per annum (galls.)	879.27	550.98	371.99
Mean butter fat test (per cent.)	4.39	4.21	4.06
Mean butter fat per cow per annum (lbs.)	385.81	231.86	150.90
Mean butter per cow per week (lbs.)	8.53	5.13	3.34

It will be observed that Mr. Tollner's herd averaged 328.29galls. more milk per cow than the mean of the combined herds of the Association, or an increase of 59.6 per cent., and 507.28galls. more than Herd 2/N, or an increase of 136.4 per cent. It also averaged 153.95lbs. of butter fat per cow more than the mean of the combined herds, or an excess of 66.4 per cent., and 234.91lbs. more than Herd 2/N, or an excess of 155.7 per cent.

From the money point of view, and with milk at 10d. per gallon, Mr. Tollner's cows averaged £36 12s. 9d. each, against £22 19s. 2d. for the Association mean, and £15 10s. for the cows of Herd 2/N.



Graphic Illustration of Daily Milk Yields of Top and Bottom Herds in comparison with Association Mean and relatively to total numbers of Cows in Herds.

On the other hand, on a basis of 1s. 6d. a pound for butter fat—its present approximate value—and 2d. a gallon for skim milk, Mr. Tollner's cows earned £35 3s. 5d. each, as against £21 5s. 10d. for the Association mean, and £14 2s. 11d. for the cows of Herd 2/N.

Finally, as the matter is of considerable interest from the point of view of those whose results have been less satisfactory, I have indicated below, month by month, the mean daily milk yield of Mr. Tollner's cows in comparison with those of the Association mean, and of Herd 2/N, both relatively to total number of cows in the herds, and relatively to those actually in milk at the time.

TABLE VI.—*Showing Month by Month Mean Daily Milk Yields of Mr. Tollner's Cows in Comparison with the Association Mean and those of Herd* 2/N.

	E. W. Tollner.	Association Mean.	Herd 2/N.
Relatively to cows in herd:—	Gals.	Gals.	Gals.
August	1.60	1.88	1.11
September	3.21	2.32	1.82
October	3.55	2.38	2.09
November	3.62	2.35	2.02
December	2.99	1.83	1.32
January	2.87	1.51	1.38
February	2.61	1.19	1.19
March	2.38	1.01	0.76
April	1.64	0.71	0.42
May	1.34	0.63	0.14
June	1.53	0.63	—
July	1.60	0.87	—
Mean	2.41	1.51	1.02
Relatively to Cows actually in milk:—			
August	2.99	2.56	2.47
September	3.55	2.73	2.11
October	3.72	2.70	2.16
November	3.62	2.55	2.10
December	3.00	1.93	1.48
January	3.06	1.77	1.48
February	2.80	1.50	1.19
March	2.59	1.33	0.79
April	1.85	1.05	0.50
May	1.61	1.14	0.36
June	1.97	1.26	—
July	2.39	1.57	—
Mean	2.80	1.97	1.52

In summary, then, taking all cows present in the herds, Mr. Tollner's cows averaged over 365 days close on a gallon of milk a day in excess of the Association mean, and 1½galls. in excess of cows in Herd 2/N. Figures in this table have been given graphic illustration herewith.

Mr. Tollner's cows were grazing from August to November inclusively: thereafter they were regularly fed, first with green oats in December; and subsequently with chou moellier from January to July inclusively, together with chaff and boiled barley, to which bran was added in July. Mr. Tollner's weakest month appears to have been May —and it seems probable that winter production would have been maintained at an even higher level, had bran been introduced into the feeding ration somewhat earlier.

Mr. Tollner is much to be congratulated on the results achieved, and it is to be hoped that others will attempt to emulate them in the Association's subsequent year.

HERD 2/J (MESSRS. J. L. HEAVER & SON).

Messrs. J. L. Heaver & Son were winners of the second prize with a mean butter fat output of 318.55lbs. per cow. The Assistant Dairy Expert (Mr. H. J. Apps) reports as follows on their herd at the completion of the first year's operations:—

"The 11 cows in this herd consist of crosses and grades of Shorthorn and Ayrshire blood of fair type and in fair condition. The herd sire is an Ayrshire."

The herd is composed as follows:—

Three years old	5
Four years old	1
Five years old	2
Aged	5
Total,	13

Details concerning the performances of this herd may be summarised as follows:—

Mean number of cows in herd	12.36
Mean number of cows in milk	10.45
Percentage of cows in milk	84.55
Mean milking period (days)	309
Mean milk per cow per annum (galls.)	738.93
Mean butter fat test (per cent.)	4.32
Mean butter fat per cow per annum (lbs.)	318.55
Mean butter per cow per week (lbs.)	7.04

In this herd the mean daily milk production relatively to total cows in the herd was represented by 2.02galls. over 365 days, or about half a gallon above the Association mean. Similarly the mean daily output of butter fat was 0.87lbs., or about 36 per cent higher than the Association mean output.

The performances of this herd show considerable irregularity, according to the period of the year considered. During the grazing months—August to December inclusive—milk yields were at the rate of over 3galls. to the cow. January and February, with an abundance

of chou moellier and oaten hay, continued to yield 2½galls. per day. March and April yields fell to 1½galls. and 1gall.: whilst from May to July inclusively mean yields were low from the presence of a large proportion of dry cows in the herd.

On the whole, results were fairly satisfactory, but it might be suggested that more stimulating feeding, in the shape of bran or crushed oats, would after December lead to more consistently heavy output of milk.

THE REMAINING HERDS.

I submit a few notes on the remaining herds which completed 12 months' tests, but were not prize winners.

Herd 2/E.—Mean milk yield per cow, 646.13galls.; and butter fat, 285.25lbs., from a mean of 11.14 cows. Mr. Apps reports as follows:—

> "The 11 cows in this herd are Jersey and Shorthorn crosses, and with the exception of two possess very fair type and fair condition. The herd bull is an Ayrshire."

Herd 2/K.—Mean milk yield per cow, 611.78galls.; and butter fat, 261.34lbs., from a mean of 20.22 cows. Mr. Apps reports as follows:—

> "This herd of 21 cows is made up of Jersey and Shorthorn crosses, and Red Poles possessing medium type and fair condition. The herd bull is a Red Pole."

Herd 2/C.—Mean yield production per cow, 640galls.; and mean butter fat, 255.45lbs., from a mean of 20.33 cows. Mr. Apps reports as follows:—

> "This herd of 19 cows possessing mainly Jersey and Shorthorn crosses are of medium type, and their condition is very fair. The herd sire is an Ayrshire."

Herd 2/F.—Mean milk production per cow, 557.08galls.; and mean butter fat, 229.91lbs., from a mean of 20 cows. Mr. Apps reports as follows:—

> "The 20 cows in this herd are crosses of the Jersey and Shorthorn breeds. They possess fairly good dairy type, and are in medium condition. The herd bull is a Friesian."

Herd 2/I.—Mean milk production per cow, 552galls.; and butter fat, 227.76lbs., from a mean of 14.26 cows. Mr. Apps reports as follows:—

> "The 12 members of this herd are not uniform in type, but are in fair condition. The herd bull is a Shorthorn-Jersey cross."

Herd 2/H.—Mean milk production per cow, 532.20galls.; and butter fat, 222.05lbs., from a mean of 26.69 cows. Mr. Apps reports as follows:—

> "This herd of 24 cows comprises grades and crosses of Jersey, Ayrshire, and Shorthorn breeds. They possess fair type and fair condition. The herd sire is a Friesian."

Herd 2/L.—Mean milk production per cow, 455.44galls.; and butter fat, 207.68lbs., from a mean of 32.3 cows. Mr. Apps reports as follows:—

> "This herd of 31 cows consists of Jersey and Ayrshire crosses. The general type is irregular, but they are in fair condition. The herd sire is a Jersey."

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Herd 2/*A*.—Mean milk production per cow, 481.89galls.; and butter fat, 207.05lbs., from a mean of 20.19 cows. Mr. Apps reports:—

"The 20 cows in this herd are of the Shorthorn-Jersey cross, possessing fair type and in fair condition. The herd bull is of Shorthorn breeding."

Herd 2/*D*.—Mean milk production per cow, 472.66galls.; and butter fat, 188.71lbs., from a mean of 13.53 cows. Mr. Apps reports:—

"The 13 cows in this herd consist of Jersey and Shorthorn crosses of fair type and condition. The herd sire is an Ayrshire."

Herd 2/*Q*.—Mean milk production per cow, 453.6galls.; and butter fat, 185.91lbs.; from a mean of 33 cows. Mr. Apps reports as follows:—

"This herd of 33 cows consists of Shorthorn, Jersey, and Hereford crosses: the type is irregular, but the condition fair. The herd sire is a Shorthorn."

Herd 2/*O*.—Mean milk production per cow, 420.43galls.; and butter fat, 170.8lbs., from a mean of 41.74 cows. Mr. Apps reports as follows:—

"This herd consists of 38 head of Jersey and Ayrshire crosses. They possess fair type, but are hardly in fair condition. The owner has decided to discard several cows as a result of last season's tests. The herd bull is an Ayrshire."

Herd 2/*N*.—Mean milk production per cow, 371.99galls.; and butter fat, 150.9lbs., from a mean of 13.92 cows. Mr. Apps inadvertently missed this herd whilst on his tour of inspection.

CHANGES IN THE HERDS IN 1922-23.

Changes in the various herds by deaths, sales, purchases, etc., may take place during the course of a season, and are naturally taken into account in averaging out results. The following summary indicates the changes that took place in 1922-23 season.

	Head.
Opening numbers	395
Purchases	11
Heifers on first calf	17
	423
Sales	45
Resignation of owner	83
Deaths	12
	140
Total numbers	423
Less reductions	140
Closing numbers	283

OWNER'S SELECTION AGAINST RESULTS.

When the Association started in August, 1922, I asked each member to indicate what he considered to be his best two and worst two cows. We shall now see to what extent casual judgment has been borne out by actual tests.

Best Cow.—Out of 13 owners, only four were able to indicate their best cow. In two cases, cows indicated as best came second; in three cases, third; in one case, fifth; in another, sixth; in another, eighth; and in another, tenth.

Second Best Cow.—Out of 15 owners, only two were able to point to their second best cow. In two cases the cow indicated as best came second. In three cases cows indicated as second best came third; in one case, fourth; in three cases, fifth; in two cases, sixth; in one case, seventh; and in another, fifteenth.

Worst Cow.—Out of 13 owners, only two were successful in indicating their worst cow: and in one instance the cow indicated as worst turned out on test to be the best. Others varied within wide limits, the most glaring examples being: in a herd of 41 the owner's worst cow came 20th; in another herd of 33 the owner's worst cow came 11th; in another herd of 30 the owner's worst cow came 18th., etc..

Next to Worst Cow.—Out of 12 owners, only three were able to pick their next to worst cow: and in one case only did the worst cow come next to worst. Other selections showed a wide range of variation.

These facts go to prove how difficult it is for a dairyman to judge the revenue-earning capacity of indivdual cows without the assistance of accurate records.

CONCLUSIONS.

The main object of Herd Testing among dairymen, it has already been stated, is to improve the output of milk and butter fat of the average cow. Data indicated for the Mount Gambier and District Association show that there is ample room for improvement. True, the performances of one herd were exceptionally good, and show what can be done in the district with good cows under efficient management. On the other hand, of the 14 herds averaging more than 10 head, which completed 12 months' test, nine averaged less than 600galls. of milk per cow, and six less than 500galls These are figures which, it is hoped, will be rectified in the future. The main weakness appears to be a rather high proportion of unprofitable cows, and defective feeding methods over five to six months of the year. It is probable, too, that lack of shelter during the winter months will contribute towards the low winter output. I hope to be in a position to record marked improvement in the next season.

TAKE-ALL INVESTIGATIONS.

[GEOFFREY SAMUEL, B.Sc., Lecturer on Plant Pathology, University of Adelaide.]

The serious nature of the Take-all disease of wheat in the newer wheat-growing areas of South Australia has led to arrangements being made with the Department of Agriculture for an extended investigation of the disease at the Laboratory for Plant Pathology at the University, in order to discover the best methods of control for this pest. It is very generally recognised that the disease does most harm in the more recently opened-up mallee districts, and as the district round Pinnaroo is one which suffers perhaps more than any other, this was visited early in November in order to see the disease in the field, and obtain specimens with which to work in the laboratory. Through the courtesy of the local Branch of the Agricultural Bureau, which provided transport facilities, it was possible to visit a large number of farms and collect many samples.

It is well-known that now that the Take-all disease is caused by a minute parasitic fungus, which enters the roots of healthy wheat plants and feeds on the tissues of the roots and the bases of the stems, so that the wheat plant sooner or later dies. The black discoloration at the base of infected plants is due to this minute parasitic fungus, but the fungus itself is so small that its form can only be distinguished with the aid of a microscope.

There are two lines upon which an investigation of this disease must proceed at the commencement, but as the work progresses these should eventually supplement one another completely. In the first place the parasite which causes the disease in the wheat must be isolated in the scientific laboratory and its life-habits studied with the microscope and by other means, so that we can understand exactly how and when it attacks the wheat plant, and can judge and experiment with the best methods and time for killing it. In the second place careful observation and study of the occurrence of the disease in the field may be expected to indicate useful methods of controlling it; for on visiting a Take-all infected district it is immediately evident that all crops are not equally infected. Crops on equally similar soil, with similar rainfall and climatic conditions, may be affected to a very different extent during the same season, while the degree of infection may vary from year to year on the same land. It is thus evident that by studying the history of land carrying healthy crops as well as of land carrying diseased crops, facts may be brought to light indicating which treatment of the land, and system of manuring, tends to check the disease, and which to favour it.

Both these lines of investigation will be followed up in the work being done on Take-all. The investigation of the parasitic fungus in the laboratory has already commenced, but this part of the work requires careful study and a long time to complete. On the other hand

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the observations made on the crops at Pinnaroo indicate possibilities of a much better control of the disease by attention to certain cultural methods. Some account of these observations is here given.

From a review of the crops inspected the following statements are found to apply in the majority of cases:—The crops which suffered most from Take-all were those following grassland; if there had been a year of fallow the attack was not so bad; and if the grassland had been burnt before fallowing the crops were still better than in the previous case.

These facts immediately suggest that grassland is a carrier of the Take-all disease; and so specimens of grasses from pastureland were taken for examination. Of fourteen different kinds of grasses examined, only two have so far been found to be affected by the Take-all disease.[1] These are barley-grass[2] and silver-grass,[3] unfortunately the two dominant grasses in the pasture. Of these silver-grass is very rarely infected, and then only slightly; whereas barley-grass is very badly attacked over a wide area. In many pastures near Pinnaroo it is difficult to find any parts free from Take-all infected barley-grass. This, then, is probably the explanation of the badly infected crops when grassland is ploughed in just before sowing. The Take-all fungus can live for some time in the soil on any pieces of ploughed-in grass or stubble, so that when barley-grass pasture is ploughed in before seeding, there may be Take-all practically all over the field ready to attack the young seedlings. Barley-grass on the fallows also may act as a carrier of Take-all, which fact shows the great importance of keeping the fallows clean.

This bad Take-all infection on barley-grass raises the question whether it would not be better to try to cut grassland out of the rotation in the Pinnaroo area for some years. A rotation such as wheat-oats-bare fallow, or even wheat-oats-oats-bare fallow, might do much to check the disease. If necessary for stock, permanent pasture might be established, perhaps with a better grass than barley-grass.

Burning the grassland or the stubble is beneficial. This was evident from comparison of crops sown on burnt and unburnt land, but is what might be expected, for the Take-all fungus is killed by burning. The stronger the burn the greater the number of disease germs killed. It is not yet certain whether a very strong burn can kill *all* the fungus, but this is unlikely, for the fungus goes some distance down into the soil on the roots of diseased plants.

Another advantage in a burn is that there is not a quantity of dead wheat or grass to be ploughed in on which the fungus can grow. Then if the fallows are kept clear of all grasses by good cultivation, much of the fungus in the soil germinates with the rains, and, finding no wheat or grass to grow on, eventually dies from starvation. The more frequent the cultivation the more completely the fungus can be got

1. The diagnosis is based on the characteristic plate-mycelium only for the present. The specimens will be kept for the development of perithecia. 2. *Hordenm murinum*, L. 3. *Festuca bromoides*.

rid of. (This recommendation for burning only applies, of course, where Take-all has been in the field. When the field is clean, and free from Take-all, there are many advantages in ploughing in stubble.)

There is one other helpful practice which has frequently been emphasised by Mr. Spafford; that is, rolling. When thorough cultivation has made a good even seed-bed this is not so necessary; but where it has not been possible to cultivate sufficiently, and it is suspected that the seed-bed and the soil below are not properly compacted, rolling is said to have a very beneficial effect.

Further it was noticed that in the majority of cases the early wheats were not so badly attacked as the late varieties. No definite explanation can at present be offered for this. More work in the laboratory and in the field on time of infection, stage of infection, temperature for infection, &c., may give the correct explanation later on. This observation could be utilised to some extent even now, however, by sowing early varieties in preference to late on land which is still suspected to contain Take-all disease.

The use of heavy dressings of superphosphate has been found largely to control Take-all on the West Coast, but no comparisons could be made between heavily and lightly dressed crops at Pinnaroo, because 60-90lbs. was the average dressing used on practically all farms. One farmer, however, had sowed a strip with 2cwts. super alongside ones with 90lbs. and 56lbs. The strip which had received 2cwts. was certainly free from Take-all, but the one with 90lbs. was also almost free; there was more Take-all on the 56lbs. strip. This single experiment is not sufficient to justify the formation of a definite opinion on the effect of different dressings of super on the Take-all disease in Pinnaroo soils. It is hoped to carry out more extensive experiments on manurial treatments next year.

A question which may now be raised in connection with the greater prevalence of Take-all in recently opened up mallee lands is this:—Is it due to some factor in the soil, and if so, what? Is there something more than the abundance of Take-all infected barley-grass at Pinnaroo, which may help to account for the greater susceptibility of this land to Take-all?

Some work done by R. S. Kirby on the Take-all fungus in America suggests a line of investigation of this. Kirby finds that the fungus grows best on substances with alkaline reaction, and that substances with an acid reaction tend to stop the growth of the fungus. May it be, then, that the soil solution in Pinnaroo soils is more alkaline[1] than in areas where Take-all is less destructive, and this is to some extent explains its greater severity at Pinnaroo?

In this connection it is interesting to recall the history of the Lower Northern areas and of Yorke's Peninsula. It is well-known that Take-all was formerly very prevalent in both these areas, but now occurs only rarely. Is this to be explained by improvement in cultivation methods, or by some increase in the acidity of the soil, or perhaps by

1. This does not refer to the absolute alkalinity, or lime-content, of the soil, but to the reaction of the *soil-solution*.

both acting together? It is known from experience in other parts of the world that alkaline soils, when brought into cultivation, become generally less alkaline owing to the ploughing in of plant remains and the consequent formation of humic acids. No figures as to the reaction of the agricultural soils of South Australia are available, however, a fact which emphasises once again the need for a soil survey of this State. In order to test the above question, therefore, soil samples were taken at Pinnaroo and these will be compared with samples from other areas. The details of these tests, and a discussion of their relation to Take-all will be published in future numbers of the *Journal of Agriculture,* in the periodical progress reports of the investigations.

A brief summary of what is so far known of the control of Take-all by cultivation may be given thus:—

Burn the stubble early after Take-all.

Fallow early.

Keep the fallows clean, especially from barley-grass, by cultivating.

Cultivation also makes a better seed-bed.

Roll if the seed-bed is not well compacted.

Use more superphosphate (1cwt. per acre is suggested for Pinnaroo until further experiments are made).

Consider taking grassland out of the rotation in bad Take-all areas. Wheat-oats-bare fallow or wheat-oats-oats-bare fallow are suggested.

Sow early wheats if Take-all is still suspected to be in the land.

ORCHARD NOTES FOR SOUTHERN DISTRICTS.

[By C. H. BEAUMONT, Orchard Instructor and Inspector.]

Spraying must be kept going against codlin moth; a light coat of arsenate of lead should always show on the fruit.

Where trees have been pruned heavily, watch the young shoots and rub off any not required; in the same manner look after grafts and if necessary give them support. Young vines should be tied to stakes or the trellis wire. Trees cut back for budding should have all shoots removed except those required for the new buds.

If the weather becomes very hot give any newly planted trees some water and mulch.

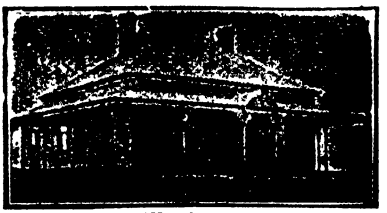
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WHEN IS WATER SAFE FOR IRRIGATION PURPOSES?

[By ARTHUR J. PERKINS, Director of Agriculture.]

Samples of water are frequently sent to us with the request that they be analysed and advice tendered as to their suitability for irrigation purposes. Unfortunately, the position is a complicated one, and one not dependent solely on the results of analysis. Much depends upon soil conditions, and particularly, perhaps, on subsoil conditions, with which is intimately connected the all important question of natural drainage. The soil, itself, for example may already be more or less heavily charged with injurious saline matter: and if irrigation waters add to this condition, the danger limit may soon be reached.

Again, the soil may have a large natural supply of lime or gypsum: in which circumstances plant growth shows a greater tolerance for injurious salts than would otherwise be the case. But the chief factor is probably the subsoil and its tendency to offer good or bad natural drainage. If the character of the subsoil is such as to offer good natural drainage conditions, *i.e.*, if it is naturally pervious to water or if relatively to surface levels it offers steep inclines down which superfluous water is able to flow, then relatively saline water, if intelligently handled, may prove perfectly safe for irrigation purposes.

On the other hand, if natural drainage conditions should be defective and surplus waters tend to stagnate at shallow distances from the surface, salts will gradually accumulate in the land and, under the influence of surface evaporation, concentrate near the

surface with disastrous consequences to surface vegetation. It follows, therefore, that waters which might be quite safe for irrigation purposes in some soils must prove dangerous in others.

Hence, apparent contradiction in views held on the subject by various authorities. Thus, Hildgard states very definitely that in California 70 grains of injurious salts to the American gallon (equivalent to 83.9 grains to the English gallon) is the extreme limit of tolerance for ordinary plant growth. On the other hand, T. H. Means, reporting on irrigation methods as practised in the Oases of the Sahara Desert, states, that water reaching 560 grains of total salts to the gallon, 50 per cent. of which is common salt, is used successfully for irrigation purposes. Similarly, in certain parts of New Mexico water going from 280 to 350 grains to the gallon appears to be freely used.

It should be observed here that irrigation water which ultimately leads to vegetation troubles is not necessarily in itself hurtful, or at a dangerous state of concentration. Thus in water culture, wheat seedlings can be grown successfully in the presence of common salt, at the rate of 180 grains to the gallon. The same water, if applied as irrigation water under defective drainage conditions, would, in the course of time, lead to soil sterility. Everything, therefore, depends upon the extent to which physical conditions favor the local accumulation of salts in zones immediately surrounding the root systems of plants.

This point may be illustrated as follows. Let us suppose that we are using for irrigation purposes water going 150 grains of total solids to the gallon at the rate for the season of two acre feet *i.e.*, about 542,580 gallons to the acre. This would bring to the soil, annually, about 11,600lbs. of injurious salts per acre. So long as these salts continued in solution in the soil moisture at the rate of 150 grains to the gallon, notwithstanding the largeness of the total quantity, they would do little or no harm to plant life. Similarly, if the bulk of the water not utilised by the roots of plants was removed beyond the reach of the latter by means of natural or artificial drainage, no harm would result. But if the surplus waters remained *in situ*, they would gradually be drawn to the surface by the combined influence of surface tension and surface evaporation and ultimately pass into the atmosphere in the form of vapor. The salts, however, would be left behind and tend gradually to increase the density of soil moisture, particularly in the surface layers which would eventually reach such a state of concentration as to lead to the death of those plants, the roots of which happened to be in contact with it.

Such, then, is a general outline of the position. It occurred to me some time back that from the purely local viewpoint a practical reply to the difficulties which frequently confront us might be found in results of the analysis of local well waters that had long been in use for irrigation purposes. I therefore asked Mr. Quinn, who is well acquainted with local growers adjoining Adelaide, to collect typical samples of water from the neighborhood and to supply details as to results secured and as to particular circumstances under which these

results had been secured. This has been done and the analysis of 14 samples of water carried out by the Director of Chemistry, are shown in Table I.

TABLE I.—*Showing Analysis of Well Waters from Neighborhood of Adelaide.*

	1	2	3	4	5	6	7
	J. Bradbrook, Athelstone (Old Well).	J. Rowell, Lockleys.	H. H. Lewis, Brighton.	F. Stanford, Fulham.	A. R. Smith, Findon.	J. Bradbrook, Athelstone.	J. B. Henderson, Campbelltown. (South Well).
	Grains per Gallon.						
Calcium carbonate	21.5	15.5	12.5	24.5	14.5	18.7	15.3
Calcium sulphate	5.2	5.2	11.3	9.0	—	—	—
Magnesium carbonate	—	—	—	—	7.6	3.6	4.4
Ferric oxide and alumina	1.0	2.3	1.5	1.1	0.9	0.6	1.0
Sodium nitrate	—	—	—	—	—	—	10.8
Undetermined	3.3	4.4	2.1	3.2	4.5	0.3	1.8
Harmless	31.0	27.4	27.4	37.8	27.5	23.2	33.3
Calcium chloride	—	—	2.2	—	—	—	—
Magnesium sulphate	22.6	8.3	—	13.7	11.6	10.4	6.9
Magnesium chloride	20.9	36.8	40.7	28.0	12.6	—	16.4
Sodium sulphate	—	—	—	—	—	11.2	—
Sodium chloride	93.3	85.1	76.6	65.4	76.9	60.7	52.1
Injurious	136.8	130.2	119.5	107.1	101.1	82.3	75.4
Total solids	167.8	157.6	146 9	144.9	128.6	105.5	108.7

	8	9	10	11	12	13	14
	J. B. Pierson, Hectorville.	E. C. Short & Sons, Paradise.	G. Weston, Marion.	G. Higgins, Paradise Park.	J. Duncan, Sturt.	F. T. Pitt, East Marden.	Martin Bros., Firle.
	Grains per Gallon.						
Calcium carbonate	12.8	9.1	13.5	9.7	10.6	5.8	7.6
Magnesium carbonate	5.2	13.3	5.9	6.6	7.1	3.1	6.2
Ferric oxide and alumina	0.8	0.5	0.8	1.1	0.8	0.3	0.8
Undetermined	3.7	4.2	3.8	3.3	1.1	1.9	2.4
Harmless	22.5	27.1	24.0	20.7	19.6	11.1	17.0
Magnesium sulphate	4.8	2.6	8.0	5.9	5.3	2.3	2.9
Magnesium chloride	7.5	—	12.6	1.0	3.7	0.3	4.2
Sodium sulphate	—	6.4	—	—	—	—	—
Sodium chloride	61.0	61.4	44.4	32.4	30.0	20.4	12.9
Injurious	73.3	70.4	65.0	39.3	39.0	23.0	20.0
Total solids	95.8	97.5	89.0	60.0	58.6	34.1	37.0

The waters dealt with in Table I. have been placed in the order of their assumed injuriousness to vegetation. Thus, of all samples examined, sample No. 1 from the old well of Mr. J. Bradbrook, of Athelstone, is looked upon as the most likely to give rise to irrigation

troubles. Similarly, sample No. 14, from the well of Messrs. Martin Bros., is judged to be the safest for irrigation purposes. The difference between these two waters may perhaps be emphasized by the following comparative statements relatively to irrigation at the rate of one acre foot, *i.e.*, approximately 271,292galls. to the acre.

	J. Bradbrook.	Martin Bros.
	Lbs.	Lbs.
Total solids per acre foot of water	6,503	1,434
Harmless salts per acre foot of water	1,201	659
Harmful salts per acre foot of water	5,302	775
Common salt per acre foot of water	3,616	500
Magnesium chloride per acre foot of water	810	163
Magnesium sulphate per acre foot of water	876	112

A glance at these figures will show how dangerous the water from Mr. Bradbrook's old well is likely to prove if surplus waters be not removed by natural or artificial drainage. Close on 2½ tons per acre of harmful salts for every 271,292galls. of water used must eventually lead to complete barrenness unless drainage conditions are very satisfactory. On the other hand, the relative harmlessness of the water from Messrs. Martin Bros'. well must be equally apparent. It is to be observed that the following salts found present in these waters have been classified as harmless:—

Calcium carbonate	Lime
Calcium sulphate	Gypsum
Magnesium carbonate	—
Sodium nitrate	Nitrate of soda
Ferric oxide and alumina	—

It should be added, further, that some of them, at all events (chiefly lime and gypsum) may be regarded as useful and helpful to plants in their struggle against harmful salts. Waters rich in these salts seem to confer upon plants a certain degree of resistance to the toxic action of some of the harmful salts. On the other hand, the injurious salts revealed by analysis are the following in order of importance:—

Sodium chloride	Common salt
Magnesium chloride	Bittern
Calcium chloride	—
Sodium sulphate	Glauber's salts
Magnesium sulphate	Epsom salts

Fortunately, sodium carbonate (the black alkali of the Americans) does not appear to be present. Of the five salts the three chlorides may be looked upon as the most dangerous to vegetation, probably in the proportion of three to one, relatively to the two sulphates. All five are readily soluble in water, and therefore easily removed from the soil by leaching and drainage should they show a tendency to accumulate therein.

The fourteen samples of water separate out naturally into three classes of varying degrees of toxicity to plant life; these are—

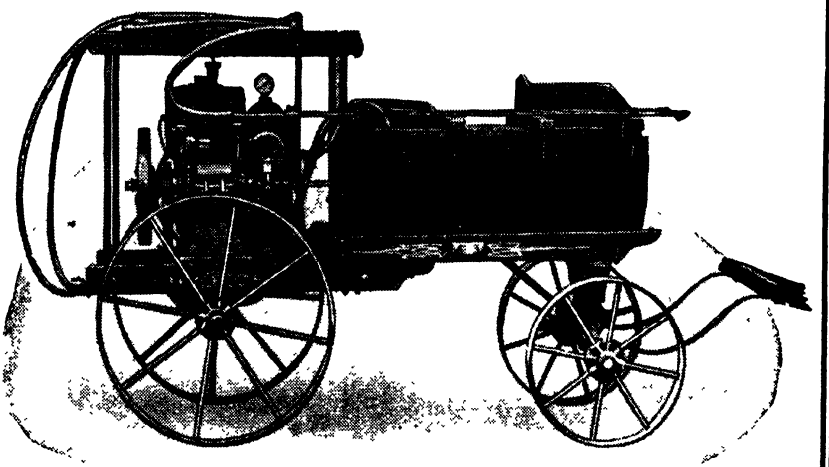
Class A (including samples 1 to 5), in which harmful salts range from 100 to 140 grains to the gallon, representing 3,876lbs. to 5,426lbs. to the acre foot of water.

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Class B (including samples 6 to 10), in which harmful salts range from 65 to 82 grains to the gallon, representing 2,520lbs. to 3,178lbs. to the acre foot of water.

Class C (including samples 11 to 14), in which harmful salts range from 20 to 40 grains to the gallon, representing 775lbs. to 1,550lbs. to the acre foot of water.

Of these three classes, there is no doubt but that waters in Class C alone, with 20 to 40 grains of injurious salts to the acre, can be described as absolutely safe irrigation waters for almost all circumstances. Waters included in the two remaining classes are safe only so long as drainage conditions admit of the complete removal of water not utilised by plant growth, and so long as winter rains are sufficiently heavy to exercise a cleansing influence on the summer irrigated land. Of the two, waters coming under Class A are naturally more dangerous than those coming under Class B. Let us now examine each one of them separately—

CLASS A (100 to 140 grains of injurious salts to the gallon).

All waters in this class are well supplied with lime, which will probably help to reduce the toxicity of the harmful salts, and all, with the exception of sample 5, are provided with the equally useful gypsum. In all five the chief harmful salt is common salt (sodium chloride); in three of them (samples 2, 3, and 4) bittern or magnesium chloride comes next in importance; whilst in the last two samples (1 and 5) bitttern and Epsom salts are of equal importance.

Sample 1 (J. Bradbrook, Athelstone).—Mr. Quinn reports as follows on the land and well and the results hitherto secured from the use of the water:—

> "Well sunk in 1894. Shaft 98ft., with 100ft. bore in same. Supply approximately 6,000galls. per hour. This well and bore penetrated very hard bluestone strata. The garden is situated on the hill-slopes rising from the Torrens river just below the Gorge. The soil consists of dark iron-stained clay loam intermixed with water-worn gravelly stones giving it a certain degree of friability. The subsoil is a fairly friable clay. Patches of black loamy soil overlie limestone rubble on some ridges to a depth of 9in. to 12in. A small gully is filled with black alluvial deposit several feet deep above gravel. The water has been used on citrus trees which have gone back, but probably as a consequence of unsuitable soil conditions rather than to the character of the water. All kinds of winter vegetables are grown on the slopes in the winter and spring, and in summer, with irrigation, all the melon family, including cucumbers, and the tomato are successfully grown, but French beans are said to fail. The owner attributes their failure to the water. The water is applied mainly in open furrows, and the soil absorbs it freely."

From this very full description we may gather that everything points to excellent natural drainage conditions, and we may assume that tolerably heavy winter rains help to leach out of the soil injurious saline matter which may have accumulated as a result of summer

irrigation. The failure of French beans is significant; and also perhaps that of the citrus trees.

Sample 2 (Col. J. Rowell, Lockleys).—Mr. Quinn reports as follows on the well, soil conditions, and results hitherto achieved:—

> "Well sunk in 1901. Depth of shaft 26ft. into gravel. Good supply, claimed to be approximately 8,000galls. to 10,000galls. per hour. Land gently undulating, consisting of flats between sandy ridges. In the flats the soil is a stiff black loam, evidently deposited by over-flows from the Torrens when in flood. It varies in depth from 2ft. to 6ft. over clay. The sand-ridges have several feet of sand over the local clay. Irrigation water is absorbed rapidly, and Colonel Rowell states that only on the rare occasions when the river floods have broken in has surface water remained unabsorbed for a few days. The land carries pears, figs, vines, apricots, peaches, and plums on the dark flat land, and almonds on the sandy rises. None of these trees have suffered from the effects of this water. Orange trees have not been a success, but the light soil and competition of other trees is probably the cause of their decline. Vegetables in season are grown for market. Cauliflowers, cabbages, lettuce, potatoes and carrots, red beet, turnips, onions, and other spring crops are successfully grown during the cool season. Trombones, melons, and tomatoes succeed well, but French beans are said to be very variable, some years succeeding and at others failing completely. Along the earthern furrows and slip-ways from the fluming, evidences of alkaline efflorescences—puffy soil or glistening particles are occasionally noticeable now (February)."

Here again, subsoil conditions would appear to suggest good natural drainage. It is probable that good winter rains help to sweeten the soil after summer irrigation. The failure of French beans and citrus trees is again significant.

Sample 3 (Mr. H. H. Lewis, Brighton).—Concerning this well and conditions surrounding it, Mr. Quinn reports as follows:—

> "Well sunk in 1908. Depth of shaft 40ft., bore in bottom 20ft. Plantation served by it abuts on the road running from the Wheatsheaf Hotel, Brighton, to Marion. Soil is stiff red loam, about 9in. to 12in. deep overlying a stiff light colored clay. This water has been used at moderate rates to scattered fruit trees and grape vines for a few seasons only. The owner has grown summer vegetables, such as trombones, tomatoes, and climber-beans for home consumption fairly successfully."

Data concerning this well are as yet too meagre for general conclusions. It is clear, however, from the results of the analysis that the permanency of satisfactory results is wholly dependent on local drainage conditions.

Sample 4 (Mr. F. Stanford, Fulham).—Mr. Quinn reports as follows on this well:—

"Well sunk in 1900. Depth of shaft 33ft. with smaller shaft 5ft. deep in bottom. Supply claimed to be 10,000galls. per hour. This garden lies on the immediate north bank of the Torrens, and with the exception of a sand mound occupied by the residence the surface is flat. Surface soil consists mainly of a dark sandy loam from 15in. to 24in. in depth, above a somewhat stiff clay. The soil, when moist, works beautifully, falling away freely from the plough. The clay beneath the deeper surface soils is apparently friable, as water does not lie long unabsorbed. The owner says, however, its absorbing powers are noticeably decreasing. The garden is devoted to vegetable-growing and is worked very intelligently. A small area of two-year-old oranges has been planted, and these are making good progress, but the owner proposes irrigating them from the river itself. In the cool season crops of cauliflowers, potatoes, lettuce, &c., are grown successfully, and summer crops such as trombones, melons, cucumbers, &c., are profitably produced. French beans do not thrive at all when irrigated from this well. On the sandy rise the house-garden has a few apples, pears, fig, orange, lemon, peach, apricot, and nectarine trees, which have grown unimpaired by applications of this water for a period of 14 years."

Here again we may note the failure of French beans, and doubts as to the success of citrus trees. It is possible, too, that the local drainage conditions may not be as good as surface indications would appear to indicate.

Sample 5 (Mr. A. R. Smith, Findon).—This property is within a mile and a half from that of Mr. Stanford. Mr. Quinn's report is as follows:—

"Well sunk in 1902 and used every year since. Depth of shaft 35ft. Depth of bore in bottom 15ft. Supply stated to reach 14,000galls. per hour. This garden is a flat area, consisting of a heavy black loam about 4ft. in depth. Overlying a dark sandy clay. It evidently consists of the deposits of light particles of flood-borne material from the Torrens. Irrigation waters soak away very rapidly in this soil, and water conveyed into trenches 4ft. apart will percolate laterally and soak intervening soil banks. This method, the owner states, alone proves successful when French beans are grown in this garden. The fruit grown have been peaches and apricots, which are failing in their ninth year. This may possibly be due to over irrigation, since summer vegetables are constantly grown between them. Orange trees, nine years old, and not inter-planted with vegetable crops are still in healthy, productive condition. These are surface flooded in check-banks, receiving heavy soakings at fairly long intervals. Vegetables grown here consist of cauliflowers, lettuce, onions, &c., during the cool season, and, in the summer, of tomatoes, trombones, and cucumbers. French beans do not thrive when irrigation water comes in contact with the plants above ground."

Here, again, French beans fail except under special treatment. Citrus trees, on the other hand, do not appear to suffer from the water. This is clear indication that present drainage conditions are satisfactory and that winter rains suffice for removing surplus salt left from summer irrigation.

CLASS B. (65 to 82 grains of injurious salts to the gallon).

All these waters are well stocked with lime, but carry no gypsum. Magnesium carbonate is also present in all of them. The chief injurious salt is overwhelmingly common salt, which varies from 44 to 60 grains to the gallon, out of an aggregate of 65 to 82. Magnesium chloride is present in three of the samples. Magnesium sulphate in all of them, and sodium sulphate in one.

Sample 6 (Mr. J. Bradbrook, Athelstone, South Well).—It should be recalled that an earlier well on Mr. Bradbrook's property has been recorded as sample 1. Mr. Quinn's report is as follows:—

> "Well sunk over 20 years ago. Depth of shaft 70ft., three drives and bore of depth unknown to present owner. Yields about 5,000galls. per hour if worked eight hours a day only. This water is used on a piece of semi-alluvial sandy loam in a gully. It has been cleaned out and used for the past four years by the present and previous occupiers. All kinds of vegetables, including French beans, have been grown successfully. I saw it being used on tender dwarf beans with apparently good results. The occupier considers the water to be of better quality than from the old well (sample 1), but the output is less abundant."

A comparison of the figures of the analysis—136.8 grains to the gallon of injurious salts for the old well and 82.3 only for the south well, amply supports the occupier's view as to the relative value of the two waters. Given satisfactory drainage conditions there is no reason to believe that this water will ever give rise to irrigation troubles. We may notice for the first time that French beans can be grown successfully.

Sample 7 (Mr. J. B. Henderson, Campbelltown)—Mr. Quinn's report is as follows:—

> "Well sunk in 1902. Depth of shaft 50ft. Supply about 2,000galls. per hour. The soil is a stiff chocolate clay loam overlying gravelly clay. The surface soil varies from 12in. to 15in. deep. This land becomes caked and hard unless carefully worked. The present owner states that he has been in the garden about nine seasons, and has grown cabbages, cauliflowers, lettuce, onions, and other winter vegetables on a small scale, and has lately taken to producing tomatoes, French beans, and melons for market purposes. The water has been in use longer on citrus trees and a few stone fruit trees. The citrus trees are of varying ages, some being very old; they are not looking in first-class order, but it is possible improper treatment and unsuitable soil have much to do with this."

There are not much data to go on with here. It would appear to be difficult soil to handle, although the gravelly nature of the subsoil would suggest good under drainage conditions. We may note that French beans do not fail. Water from this well offers one peculiar feature, namely, 10.8 grains of nitrate of soda to the gallon. This may possibly be due to sewage contamination. In the meanwhile, it may be noted that an acre foot of water will bring to the soil the equivalent of about 4cwts. of nitrate of soda to the acre. It is possible that ultimately this water may affect adversely the general mechanical condition of this stiff land.

Sample 8 (Mr. J. B. Pierson, Hectorville)—Mr. Quinn reports as follows:—

> "Well sunk in 1908. Depth of shaft 70ft., bore in same 50ft. Supply about 3,000galls. per hour. Soil consists of red clayish loam which predominates over the plains of Adelaide. Twelve inches of surface loam overlies a fairly friable red clay, with a sprinkling of water-worn sandstone and shale. This gives to the subsoil requisite porosity for getting rid of surplus irrigation waters. The owner grows winter vegetables successfully and in summer, under irrigation, French beans, cucumbers, and other melons. He waters in furrows and incorporates loose stable manure freely into his ground. The place is full of orange and lemon trees, 17 years old, and all in thriving condition; peaches, apricots, and grapes are also grown successfully."

Here we have good natural drainage and successful growth of all usual cultivated plants. No doubt the winter rains help to maintain the land sweet.

Sample 9 (Messrs. E. C. Short and Sons, Paradise).—Mr. Quinn reports as follows:—

> "Well sunk in 1910. Depth of shaft 100ft., and bore inserted (1913) 50ft. deep. Supply about 2,500galls. per hour. The orchard is situated on the north bank of the Torrens. It consists chiefly of an alluvial deposit overlying and intermixed with water-worn gravel in that portion which adjoins the river bank; towards the rising ground, however, at a short distance from the foothill, is to be found a bar with 4ft. of soil overlying a hard clay subsoil. Generally speaking, in local circles this garden land is looked upon as ideal citrus soil and the fine growth of the trees supports this contention. The owners informed me that the water found in the shaft was of inferior quality prior to the insertion of the bore in 1913. The owners have used this water each summer since 1913 on citrus trees and stone fruit. It is pumped along furrows and rings, and it quickly disappears in the soil, which appears to drain perfectly."

Clearly, no trouble need be anticipated here.

Sample 10 (Mr. G. Weston, Marion).—Mr. Quinn reports as follows:—

"Well sunk 1912—shed well. Shaft 60ft., bore 90ft. (water supply chiefly from bore). Capacity 9,000galls. per hour. Plantation comparatively flat, adjoins Marion road. Occasionally flooded in winter when sluice gates admitting flood-waters from a creek from Eden Hills are opened. Soil varies from stiff reddish clay loam, about 9in. deep, overlying a deep layer of fairly stiff clay to a freer type of dark sandy loam overlying a gravelly clay. The latter type represents the land formerly flooded by the creek previously referred to, receiving gravel deposits and lighter silt from time to time; and thus laying down a drainage bed and building up and deepening the surface soil above it. Water from this well has been used every summer on grape vines, peaches, apricots, plums and almonds. The owner states that four waterings were usually given, each season, and the areas between the trees and vines were flooded in furrows and basins. The water soaks away in two or three hours. The stiffer land does not absorb the water quite so readily. No ill effects have been noted from the use of this water. Mr. Weston states that he has grown French beans successfully.

There is apparently no reason for apprehension here.

Class C.—20 grains to 40 grains of harmful salts to the gallon).

All these waters are stocked with lime, and the main injurious salt is common salt, present in relatively low proportions.

Since waters from all four wells are obviously safe for irrigation purposes, it seems unnecessary to refer to them individually ot further length. With reference to sample 13 (Mr. F. T. Pitt, East Marden), Mr. Quinn points out that citrus trees have died back. It seems probable, however, that this must be attributable to unsuitable soil conditions rather than to the quality of the water, which shows no more than 23grs. to the gallon of injurious salts.

General Conclusions.

From the above data the following conclusions appear permissible:—

1. Under Adelaide conditions, *i.e.*, with winter and spring rains aggregating 14in. to 15in. irrigation water going up to 140grs. of injurious salts to the gallon may be used for fruit trees and vegetables, with the exception of citrus trees and French beans, providing natural drainage conditions are satisfactory.

2. Under similar conditions, citrus trees and French beans may safely be grown with water going 75grs. to 80grs. of injurious salts to the gallon.

3. Irrigation waters going over 140grs. of harmful salts to the gallon have not come under review. Judging, however, from the experience of older countries situated in the arid regions of the globe, it seems probable that around Adelaide even 200grs. to the gallon will not prove disastrous to plants, other than citrus trees and French beans, providing drainage conditions are perfect.

4. It should be stated that it is a fact of common experience in other countries that given satisfactory drainage, irrigation water highly charged with saline matter should be used freely rather than sparsely. Small quantities of water lead to rapid concentration of salts under the influence of surface evaporation, whereas, an abundance of water tends to retain soil moisture at the requisite degree of dilution.

5. Finally, it is clear that relatively highly saline irrigation water can be used in summer with greater safety in those localities where winter rains are heavy than in those in which they are normally light. Similarly, the presence in the soil of a high proportion of injurious saline material adds to the danger of using for irrigation purposes waters highly charged with harmful salts.

RIVER MURRAY HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR OCTOBER, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.		Butterfat.	
			Per Herd during October.	Per Cow during October.	Per Herd during October.	Per Cow during October.
			Lbs.	Lbs.	Lbs.	Lbs.
1/C	32	26·77	28,626·5	894·58	1,122·89	35·09
1/J	21	17·10	12,846·5	611·74	586·03	27·91
1/L	19	17·97	14,935·5	786·08	655·57	34·50
1/M	21	13·48	7,420	353·33	399·44	19·02
1/R	17	15·16	10,316	606·82	471·23	27·72
1/T	13·68	11·35	7,737·5	565·60	416·40	30·44
1/W	18	15·55	11,193	621·83	436·85	24·27
1/X	18	14	13,252·5	736·25	560·60	31·14
1/Y	20·77	19·16	14,809·5	713·02	686·55	33·05
1/Z	21	17·42	14,393	685·38	658·71	31·37
1/AA	7	4·84	4,925	703·57	232·40	33·20
1/CC	19·13	19·06	11,539·5	603·21	494·24	25·84
1/LL	9	9	5,332	592·44	262·19	29·13
1/EE	10	8	6,153·5	615·35	292·11	29·21
1/FF	12	12	9,594·5	799·54	410·60	34·22
1/GG	8	7·03	5,634·5	704·31	266·97	33·37
1/HH	13	9·48	7,625·5	586·57	321·13	24·70
1/II	13	12·06	8,629·5	663·81	355·47	27·34
1/JJ	15	9·58	7,157	477·13	310·69	20·71
1/KK	14	8	5,967·5	426·25	278·17	19·87
1/DD	20	18·90	13,667	683·35	607·29	30·36
1/MM	16	15·19	9,420·5	588·78	431·29	26·96
MEANS	16·25	13·69	10,508	646·50	466·22	28·68

RINDERPEST OR CATTLE PLAGUE.

The seriousness of an outbreak of Rinderpest, previously unknown among cattle in Australia, cannot be over estimated on account of the rapidity of its spread, the heavy mortality, and the consequent expense involved in adopting combative measures to control and suppress it. Something of the latter phase may be gleaned from the knowledge that in 1865 an outbreak extending over a period of three years, cost the British Government something like £5,000,000 in order to suppress it.

In addition to the cost of administrative and executive measures needed in its overthrow, there is also the fact that the knowledge of its presence in our herds might have a very serious prejudicial effect on our export trade in the future.

The natural series of questions occurring to the average man are:—

(1) What is Rinderpest?
(2) What animals are affected?
(3) What is the mortality?
(4) What are the lesions?
(5) How is it diagnosed?
(6) What treatment if any?
(7) What protective measures are adopted by the Commonwealth and State authorities to prevent its appearance here?

The answers to the above questions supplied by the Stock Department are as follows:—

(1) This is an acute infectious disease of cattle, readily transmissible from one to the other. It usually takes a fatal course and the period of incubation varies from three to nine days.

The original home of Rinderpest has been the subject of authoritative dispute, some consider it the territory surrounding the Black Sea and the Volga river in Russia, others Central Asia. From here it has spread to nearly every country in Europe and Asia, where it has proved a scourge. At present it prevails in Russia, India, South Africa, and the Phillpines.

The cause is probably one of bacterial origin and the contagion is conveyed by virus. This may be transmitted from one sick animal to a healthy one by various means, such as excreta, discharge from nostrils, saliva, urine of the diseased. It may retain its vitality outside the body for an indefinite period, and it is on record that an outbreak occurred as a result of feeding hay soiled with discharges from an infected animal twelve months previously. Manure, fodder, and bedding, soiled with discharges may convey it; persons may carry the virus on their clothes or boots. Ships conveying fodder, bones, &c., may be the means of carrying the disease from country to country or State to State.

(2) Cattle are the animals principally affected, but all large ruminants may become affected, *i.e.*, buffaloes, reindeer, and large antelopes. The small antelope escapes. Sheep and goats are susceptible, but only in a less degree.

(3) In a country previously free from this disease, the death rate is about 90 per cent. In country which has previously been invaded, the death rate is about 45 per cent.

(4) No definite lesions are noted if the animal is slaughtered in the early stages of the disease, only the blood being affected. Later stages show the fourth stomach to be affected with a claret colored ulceration. This claret colored ulceration is also found in the bowels and arranged in longitudinal folds. These lesions are covered with diphtheritic exudate. Lesions may be found in the nostrils, mouth,pharynx, stomach and bowels; the vagina and rectum are always affected; the gall bladder is also involved.

Diagnosis.

(5) The best time to examine animals suspected is at sunrise, after a cold night. This fact was well known to the Boers in South Africa. The necessity for this is due to the fact that sunshine masks somewhat the earlier symptoms. The first sign is a rising temperature. After 24 hours there is noticed a dribbling of tears from the eyes, followed by a spasm of the eye lids, irritation of the mouth, and dripping of saliva. Facial muscles are contracted in a painful manner, diarrhoea gets worse, gradually becoming mixed with mucus, then blood. An offensive odor is a characteristic of this stage of the disease. The animal gets weaker, muscles get flaccid, the skin lusterless and dry, becomes wrinkled and cold, and the ears and head, droop from weakness. One may occasionally meet with a typical case in which no diarrhoea is present, *i.e.*, old oxen or bull.

Treatment.

(6) The only effective method of exterminating the disease in a previously clean country is by limiting the movement of all stock within a given zone, and by the slaughter of all affected animals and exposed animals. If the disease occurs in a country previously visited by the disease, successful results may follow a system of immunization, by inoculation of exposed animals. This immunity may be obtained by (1), inoculation of bile from an animal which has recently died of Rinderpest; (2), Inoculation of glycerinated bile or virulent blood; (3) By simultaneous methods of inoculation of a strong standardised serum and virulent blood.

Protective Legislation.

(7) This will be found provided for in Quarantine Regulations 1922, part 3, (providing for the quarantine of vessels, persons and goods) together with part 6, which provides for the quarantine of animals from Ports external to the Commonwealth. By the above, ample protective machinery is provided by the Commonwealth against the importation of animal disease, either in the form of diseased animals or *via* medium of material such as fodder, fittings, or any material

capable of acting as a medium for the conveyance of disease. In addition to the above no cattle are imported from Russia, India, South Africa, or the Phillipines. Animals that are imported from the United Kingdom and Ireland, Canada, United States of America, and New Zealand are admitted only on the production of the necessary declarations and certificates, notices and permits issued by authorised quarantine officials at the port of shipment. In addition all animals are inspected and examined on arrival by a Government Veterinary Officer, afterwards they are compelled to undergo an adequate period of quarantine during which they are subjected to certain prescribed tests of health as set out under Quarantine Regulations.

Animals imported from other States must be accompanied by the owner's Declaration of Health and countersigned by an authorised Inspector of the Stock Department of that State.

In addition to the above there is a system of weekly notification from one State to another of any outbreak of disease having taken place. This notice indicates the district and nature of the disease.

The Stock Diseases Act provides that the owner of any stock suspected of being affected with any infectious or contagious disease shall report same to the Stock and Brands Department, also the nearest Inspector of Stock within 24 hours. The penalty for breach of notification is a fine of not exceeding £20 per day for each and every day on which an owner neglects or omits to perform his duty.

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FARMERS' DAY AT KYBYBOLITE.

One hundred and twenty delegates representing the Mount Gambier, Kalangadoo, Penola, Mundalla, Naracoorte, Kybybolite, Frances, Glencoe, and Moorook Branches of the Agricultural Bureau, and in addition a number of ladies, including representatives of the Kalangadoo Women's Branch of the Bureau, visited the Government Experimental Farm, Kybybolite, on November 28th. The party, reinforced by representatives of the Department of Agriculture, including the Director of Agriculture (Professor Arthur J. Perkins), the Assistant Dairy Expert (Mr. H. J. Apps), Mr. C. J. Tuckwell (Member of the Advisory Board), Field Officer for the South-East (Mr. E. S. Alcock), and the Secretary, Advisory Board of Agriculture (Mr. H. J. Finnis), and under the guidance of the Farm Manager (Mr. L. J. Cook), made a tour of inspection of the Institution. Pamphlets containing details of the cropping, particulars of results secured during recent years, and plans of the different fields, aided visitors in securing an insight into the operations of the farm.

Morning Inspection.

After having assembled at the Homestead, the party first paid a visit to the Farm Orchard of about 10 acres, which is under the care of Mr. S. C. Billinghurst. From this point the party journeyed to the Irrigation Plots which were carrying six varieties of maize for grain, Hunter river lucerne, 11 varieties of sorghum, sudan grass, four varieties of sunflowers, and three varieties of mangels. Water used on these plots is lifted by a 4in. centrifugal pump, delivering 12,000galls. per hour, from a 40ft. well. At the time of the visit water was being distributed by means of the open furrow system. A series of plots designed to test a six-course rotation next came under observation. The rotation consisted of wheat, hay, turnips, barley, and two year's pasture (Italian rye-grass and Alsike clover). A very fair stand of Alsike clover and Italian rye-grass was to be seen on field 9F and the barley in 9E promised a good yield. In field 15 a collection of oat varieties was growing, an outstanding feature being the appearance of the Early Burt and Algerian varieties. Field 16 was under summer crops (maize, sorghum, and sunflowers) without irrigation. They had all germinated well and made a good start.

Afternoon Inspection.

After an adjournment for luncheon, the first fields inspected were Nos. 4A to 4D, which were carrying plots testing the Norfolk rotation, *i.e.*, wheat, turnips, oats, peas. This rotation has now been under test for five years. The plots gave indications of some very promising yields, especially of peas and oats. Alongside these fields, a six-course rotation in fields Nos. 6A to 6F was under test. This rotation consisted of peas, wheat, turnips, barley, crimson clover, and oaten hay. A very good stand of crimson clover was noticed in 6A and the wheat crop in 6D and barley in 6F were very promising. From this point the

party journeyed to the Pasture Improvement tests which attracted considerable interest. Plots in field No. 7 were visited first. These consisted of areas designed to show the improvement to natural pasture without cultivation as a result of the treatment with various phosphatic fertilisers. The tests have been in progress for five years, and plot No. 3, which has now received a dressing of 1 ton of lime and 5cwts. superphosphate during that period, showed a remarkable growth of naturalised grasses, the principal of which were Hop clover and trefoil, and barley and wallaby grasses. Field No. 13, consisting of land previously under cultivation, was this year divided into plots, and on July 1st was top-dressed with various phosphates with the object of testing tetraphosphate against lime and superphosphate. A marked improvement was noticed on all the dressed plots, but No. 5, which received 5cwts. super per acre, showing a thicker mat of growth, especially of naturalised clovers, than the other plots.

Fields No. 20A and 20E which have been ridge ploughed in seventeen 6in. ridges for some years were under crop this year. One was sown to three varieties of wheats (White Essex, Leak's Rust-proof, and Queen Fan), which promised good average yields, and the other to oats and Subterranean clover, the clover being seeded at the rate of 4lbs. per acre, broadcasted after the field had been drilled with oats and 2cwts. of super per acre. The growth of this clover was very pleasing, there being a thick mat practically covering all parts of the field that had not been actually under water for about four months of the winter. This field should give an abundance of stubble feed.

The Livestock.

The stock, which consisted of 35 horses, about 70 head of Ayrshire and grade Ayrshire cattle, 114 pigs (including 20 pedigreed Middle Yorkshire sows), and 550 sheep (including 40 English Leicester stud ewes and grade Leicester crossbreds) were in particularly good condition generally. The cattle and pigs came in for considerable admiration. The recently imported bull "Ida's Laird of Gowrie Park" was the centre of no little attention. This animal was bred by Mr. W. P. Brisbane, of Camperdown, Victoria. It was 14 months old and gave every appearance of developing into an exceptionally fine type of the breed. During the past 12 months the herd sire has been "Loyalty of Bridge View." This animal was also generally admired; it was bred at Gawler by Mr. R. J. Clements, and is the progeny of a cow which won the Championship of the breed at the last Royal Agricultural and Horticultural Society, Adelaide.

During the luncheon adjournment, Representative Cameron, M.H.R., proposed a vote of thanks to the Staff of the Department and to the Government for affording the opportunity for visitors to inspect the farm. This was seconded by Mr. A. A. Sassanowsky, and supported by Messrs. J. C. Brown (Frances); W. Clifford (Penola); A. Ferguson (Glencoe); G. Shepherd (Kybybolite); J. L. Heaver(Moorak); W. Loller (Naracoorte); and a representative of the Mundalla Branch, Professor Perkins and Mr. C. J. Tuckwell acknowledged the vote of thanks.

DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA.

OFFICIAL STUD CATTLE TESTING.

The following are the rules governing the *Official Testing of Pure Bred Stud Cattle for Production*:—

1. The official year shall commence July 1st, and end June 30th.
2. The testing shall be performed by qualified Departmental Officers.

Cows Eligible for Testing.

3. Only those cows and heifers which are registered, or have been accepted for registration in a recognised Herd Book or Pure Stock Register, will be accepted for test.
4. If a breeder owns more than one herd upon separate farms, each herd shall be considered and recorded as a separate herd.

Proportion of Herd which must be Tested.

5. All herd book cows in a stud herd which has been submitted for testing shall be tested annually unless exempted by the Minister of Agriculture on written application from the owner stating exceptional circumstances, and indorsed by the Director of Agriculture; but in no case shall more than 50 per cent. of the females in lactation during each year be so exempted; and further, all cows must be completely tested at least once before reaching the age of four (4) years and at least once again before reaching eight (8) years of age.

Exemptions from Testing.

6. Exemptions from the test may be granted in respect of cows.
 (*a*) over ten (10) years of age and those that are sick, diseased, or injured.
 (*b*) any cow that aborts during her lactation period shall forthwith be drawn from test.

Branding for Identification.

7. Every cow or heifer entered for test, and every calf, the progeny of such cow or heifer must be branded to the satisfaction of the Department of Agriculture in such a manner as to ensure identification.

Fees for Testing.

8. Each owner shall pay to the Department of Agriculture on entry of his herd and annually thereafter, at the commencement of each Official testing year, a herd entry-fee of Three Guineas. There shall also be paid in advance an amount of Ten Shillings testing fee for each lactation period of each animal submitted for test. The minimum total amount of herd entry fee plus testing fee which shall be paid per herd on account of an official year shall be Five Pounds (£5).

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When Official Test Commences.

9. The official lactation period shall commence five days after calving. The first five days' yield shall not be included in the testing period.

Duration of Official Test.

10. The official lactation period shall be 273 days, which may be extended to 365 days at the request of the owner, but such request must be submitted to the Director of Agriculture not later than One Month prior to the expiration of the 273 days.

Method of Calculating Records.

11. The yields for the Official Record shall be calculated as follows:—

(*a*) The lactation period shall consist in the case of the 273 days' record of nine (9) sub-periods, covering respectively eight (8) sub-periods of thirty (30) days and one (1) of 33 days; and in the case of 365 days' record of eleven (11) sub-periods of 30 days and one (1) of 35 days.

(*b*) The cows shall be tested once in each sub-period at approximately equal intervals of time.

(*c*) The official yield shall be the sum of the yields of each sub-period.

(*d*) The yield for each sub-period shall be calculated as follows:— The milk yield shall be the amount produced over 24 hours multiplied by the length of the sub-period. The butterfat yield shall be determined by multiplying the number of days in the sub-period by the sum of individual totals obtained from separate tests of each milking during the 24 hours.

Method of Taking Samples.

12. The Official Tester shall satisfy himself that all cows are stripped out at the milking prior to the commencing of the 24 hour Official Test.

13. The Official Tester shall weigh on approved scales during each milking the milk of all animals under test and shall record such weights on printed charts prepared for the purpose by the Department. A sample from each milking shall be taken by the Official Tester, after he has properly mixed the milk from bucket to bucket at least three (3) times.

(*a*) No milk weight shall be credited to any cow unless the aggregate of all milkings in the 24 hours totals four (4) lbs. or over.

Testing at Irregular Intervals.

14. In the event of it not being possible to make a test immediately after an interval of 30 days, the test may be taken not more than 35 days or less than 25 days after the preceding test; and if this is not

practicable the calculations for the sub-period concerned shall be obtained by averaging as in the case of an abnormal test (*vide* rule 15), except that in addition to the tests of the preceding and succeeding months, the weights and tests (if any) of the sub-period under review will also be included in making the average.

Averaging Abnormal Tests.

15. If the Official Tester is of opinion that any individual test is abnormal, he will not register it, but will make a special visit to the dairy and weigh and test another sample of milk. If this cannot be arranged, he will register a test obtained by averaging those of the nearest two (2) sub-periods.

Cows Not Tested Until Two Months After Calving.

16. When it is found impracticable to make the first test during the first 60 days of a lactation period, the Department may (upon receiving a Statutory Declaration from the owner, or other acceptable proof as to the date of calving) credit yields for such 60 days based on the official test registered for the third sub-period.

In every instance of the first test not being made during the first sub-period, the Official Tester shall report in writing to the Department the reasons for such delay.

Certificate and Butterfat Standards.

17. (*a*) All calculations shall be made and recorded and published in terms of pounds of milk and butterfat only.

(*b*) The Chief Clerk of the Department of Agriculture shall be the Official Recorder and shall sign all certificates.

(*c*) The Department of Agriculture shall issue certificates showing the records of each pure-bred cow that attains or exceeds the Official standards as set out hereunder:—

Junior 2 years old		200 lbs.	Butterfat
Senior 2 " "		225 "	"
Junior 3 " "		250 "	"
Senior 3 " "		275 "	"
Junior 4 " "		300 "	"
Senior 4 " "		325 "	"
Mature cows		350 "	"

In the above standards a Junior animal in each class is one which at date of calving has not attained to 2½, 3½, or 4½ years respectively, and a Senior animal is one which at date of calving has attained or is over 2½, 3½, or 4½, but less than 3, 4, or 5 years respectively.

Publications of Records.

18. Records of all cows submitted to the test, including those that fail to reach the Official standard, shall be published in the *Journal of Agriculture*.

Particulars of Dates of Calving; Foodstuffs, &c.

19. (*a*) Particulars as to dates of service and calving shall be supplied to the Official Tester.

(*b*) Owners must supply on the request of the Department of Agriculture, a declaration as to the class, quantity, or any other details regarding the rations fed during the period covering the test; and when deemed necessary by the Department, permit samples of the different foods to be taken for analysis.

(*c*) All particulars required by the Department shall be made by sworn declaration when deemed advisable.

20. The feeding of whole milk or cream to cows under test is prohibited and records from cows so fed shall be disallowed.

21. Owners of herds must afford every facility to enable the Official Tester to carry out his duties, and must provide him with accommodation over night when necessary.

Owners to Supply Testing Equipment.

22. When necessary, each owner may be required to provide and keep on his premises a Babcock Testing Machine and equipment to suit the requirements of the Department of Agriculture.

Disqualifications.

23. Should the owner of any herd entered for testing not conform to these regulations, such herd shall be subject to disqualification for such period as the Minister of Agriculture may determine.

Testing Other Than Herd Book Animals.

24. Cross-breds, grades, and unregistered pure-breds, the property of owners submitting herd book cattle, may be tested by the Official Tester, provided he is not unduly detained thereby; but certificates showing production of such cows will not be issued. The testing fees shall be governed by Clause 8 hereof.

The Legal Aspect.

25. No person who has submitted any herd, cow, or heifer for testing, or for whom any herd, cow, or heifer is at any time tested by the Department, or by any of its officers or servants, shall have any claim for damages, whether arising out of breach of contract, tort, or otherwise howsoever, against His Majesty the King, the Government, or any person in the service or employment of his said Majesty or the said Government, for or in respect of anything done, or omitted to be done, under or in connection with these rules, or the performance, or non-performance, of any act or duty thereunder, or in carrying out or in attempting to carry out the testing of any herd, cow, or heifer, or for anything done or omitted in reference thereto, or in connection therewith.

NOTES FROM GOVERNMENT ORCHARD, BLACKWOOD.

[By RODNEY FOWLER, Manager.]

Weather conditions during the month have been more settled and trees in bloom have had a much more favorable chance of setting crops of fruit. Rain fell on only seven days, principally only in light showers, the maximum fall being 55 points on the 17th, which proved a very useful rain from a cultivation point of view. The mean shade soil temperatures have remained fairly even, though once or twice great variations occurred in the shade temperatures. Though apples in most instances bloomed well the setting is again somewhat disappointing in commercial varieties, with the exception perhaps of Jonathans; Cleopatras, Dunn's, and Rome Beauty have set only moderate crops.

Cherries are now coming in, but the bird pests—starlings and blackbirds—are taking a heavy toll. These pests seem to be getting worse each year. The cherries ripen just at the time the young birds are in the nests and it is quite a common sight to see a parent bird flying off with a cherry in its beak on which to feed the young, thus predisposing each succeeding generation to a fruit diet. It would be interesting to know if this habit is long continued what the ultimate result will be. Will what is naturally an insectivorous bird become altogether a fruit-eating one?

CHERRY STOCKS.

The question of cherry stocks is one which at the present time is causing some inquiry in the other States as the cherry-growing industry is said to be languishing for want of some solution of the problem. An interesting series of stock tests in connection with the cherry have been running in this orchard for some years and data in connection therewith are now being prepared for publication by the Horticultural Instructor. It is interesting to note in the orchard collection of some 200 varieties all worked on Mazzard stocks, the difference in vigor and bearing habits of the different varieties; some instructive information may be collected from this source.

STRAWBERRIES.

Strawberries have been fruiting during the month, and the present cool conditions are favorable to a continuance of the crop, as plenty of bloom and berries are still showing. Varieties showing most promise are Gandy, Ettersburg 98, Ettersburg, Paxton, Leura, and Dr. Moore. Ettersburg has carried an enormous number of berries, but they have developed into somewhat small fruits. Demand has been good and prices favorable to the grower. Where possible the strawberry beds should be kept moist and free from weeds. A little liquid manure in the form of sulphate of ammonia, (1oz. to 4galls. of water) applied after watering will help the plants along wonderfully. All

runners should be suppressed if it is desired to get a second crop. They can be forced along later in the season if new plants are wanted.

Curl Leaf.

In previous notes reference was made to some spraying tests with various preparations for the control of curl leaf in peaches. During the month the effects have been very noticeable, and confirmed my previous statements that for efficiency and cheapness there is nothing to beat the recognised Bordeaux or Burgundy mixtures made from the formula recommended by the Horticultural Branch of the Department of Agriculture.

Combined Sprays.

As doubts are sometimes expressed by growers as to whether injury will result when lime sulphur and arsenate of lead are used as a combined spray, tests were made during the month and the results go to show that when carefully mixed, lime sulphur 1 in 70, with arsenate of lead added just before using is a perfectly safe spray to apply, no injury resulting to foliage or fruit. Burgundy, with arsenate of lead, has also been reported as dangerous, owing to liability of injury to the young fruits, but from tests made during the month there appears to be no justification for supposing that this spray will cause the young fruits to fall off.

Red Spider.

Growers sometimes ask if lime sulphur applied to plum trees at this time for bryobia mites (sometimes called red spider) will injure the trees or crops. This also has been tested and again the results go to show that lime sulphur 1 in 70 is a perfectly safe spray to apply and also very efficient in combating mites. This has been demonstrated on almonds in the Hackney orchard and the almonds there are now regularly sprayed with lime sulphur spray. These sprayings were applied during a hot spell with temperatures nearing 100° Fahr. in the shade.

Woolly Aphis.

Applications of salt in strengths varying from 4lbs. to 14lbs. per tree were given to apple trees affected with woolly aphis (this having been reported as being an effective treatment for trees so affected), but it is too early yet to say anything definite. So far the treatment has not had any effect. During the month spraying with Black Leaf 40 (nicotine sulphate) has been carried out against this pest, a motor pump and spray pistol being used, and I have no hesitation in saying that this is the most effective weapon I have ever used against woolly aphis. The ease with which it can be manipulated and the force with which the spray can be concentrated on any particular spot makes it an invaluable weapon in the fight with woolly aphis. The difficulty has always been effectively to get at the insects owing to their natural protection, but the spray pistol has overcome that difficulty.

Codlin Moth.

Early in the month the first codlin moth on the wing was observed, and numbers have since been killed in the fruit house, and this fact has rather important bearing on the question of spraying for this pest.

WHEN POULTRY KEEPING IS MOST PROFITABLE.



Taking it by and large, poultry keeping is a game of many ups and downs for the poultry keeper who takes no precaution to keep his hens laying consistently the whole year round. The profits made when eggs are plentiful very quickly diminish when "Winter comes" and eggs are scarce. And yet, making sure of a good Winter egg supply involves only the expenditure of a ha'penny a day for every 12 fowls and the very little effort involved in mixing

'KARSWOOD' POULTRY SPICE

with the wet or dry mash. This is a fact well known to prominent breeders and to over half a million small poultry keepers throughout the World. 'KARSWOOD' supplies tonic ingredients and food properties which promote health and vigor in the birds, thus enabling them to produce more eggs by natural means, and to effect a quick and thorough moult, and get down to the business of earning profits again without delay.

By starting 'KARSWOOD' feeding now, you are insuring your Winter profits, you are increasing the value of your birds, and you are making certain of fertile, hatchable eggs and healthy chicks when next the breeding season comes around.

Start this insurance today. Go to your local grocer, storekeeper, or produce dealer, get a 1s. packet and commence feeding to-morrow. If your local dealer cannot supply you, he can get supplies from the Agents named below.

NOTE THE ECONOMY.

One tablespoonful (½oz.) of 'KARSWOOD' Poultry Spice (containing ground insects) is sufficient for 20 hens for one day. So that it costs you less than a ½d. a day for 12 birds.

1s. packet (½lb.) supplies 20 hens 16 days.
2s. packet (1lb.) supplies 20 hens 32 days.
13s. tin (7lbs.) supplies 140 hens 32 days.
14lbs. tins, 25s. 28lbs. tins 48s.

Makes 12 Hens Lay for ½d. a Day.

AGENTS FOR SOUTH AUSTRALIA—

S. C. EYLES & Co.,
CURRIE ST., ADELAIDE.

There has been an increasing tendency amongst growers to think that the calyx spray is unnecessary, as only a few of the insects are on the wing. If the fight against this pest is to be effective or a decent percentage of clean fruit harvested it is not safe to neglect this spraying, remembering that every grub allowed to escape at this time means many more to be killed later on. The apples and pears in this orchard have already—end of November—received two sprays with arsenate and a third spray will be started in a few days.

Curculio Beetles.

It is possible that curculio beetles will make their appearance shortly. They come sometimes in great numbers and do a considerable amount of damage. Many methods of combating them have been tried but they are difficult to deal with. Arsenate of lead (1lb. powder in 8galls. water) is very effective when sprayed on cherry trees. They can be trapped in thousands in an oil trap placed round the butts of the trees. Where they appear steps should at once be taken to check them, otherwise they will certainly do a vast amount of damage, particularly to young trees.

Citrus.

Citrus trees have bloomed well and are carrying a nice crop of fruits though of course there will be the usual falling off of small fruits, but it looks as though a good crop will mature. It is rather noticeable in places that the western side of the trees seems to have suffered some sort of set-back, due probably to cold winds or other unfavorable climatic conditions. At the present time in this orchard this condition is most noticeable.

Budding.

The season is now at hand when the operation of budding may be carried out. Undesirable varieties can be changed, and unprofitable trees made productive by this process, which is very simple and may be successfully undertaken by the amateur grower. There is in the Blackwood orchard a very large collection of varieties of all sorts of fruits, and bud wood from these is available to any grower so desiring, on payment of slight cost for packing and postage, usually about 1s.

Fig Wasp.

The *Blastophagus* has been fairly active during the month, but the rather cold conditions and the absence of warm sunshine seems rather to have retarded its activities, and as a result large numbers of the spring crop of Capri figs are now falling to the ground, although a sufficient quantity remains to fertilise the coming crop of Smyrna figs. Any grower of Smyrna figs desirous of securing a small number of wasps can have same on applying direct to the Horticultural Branch of the Department, or by paying for packing and postage when thus dispatched. The summer broods are usually ready to issue from the Capri figs about the middle to third week of December.

ANALYSES OF SAMPLES OF ARSENATE OF LEAD

The Horticultural Instructor (Mr. Geo. Quinn) reports that during September officers of the Horticultural Branch purchased from retailers in Adelaide, all the available brands of Arsenate of Lead as placed on the local market, in sealed packages. These were submitted to the Department of Chemistry for testing for chemical and physical properties. The results are given by the Director of Chemistry, and in the undermentioned tables puchasers may note the peculiarities of the various brands. Discussing these, Mr. Quinn remarks:—

It will be noted from the table showing the moisture free condition that in so far as their constituent parts are concerned, they present a very even quality—some possessing a slightly higher water soluble arsenic content, but from American standards, none should hold sufficient to cause injury to the foliage of the trees sprayed with same. The powers of holding in suspension in water vary vastly, some brands which stood high in the tests of previous years have dropped down the scale, and others formerly low in suspension indicate a desirable rise in this respect. It is a matter for regret that these tests could not be made and published at least two months earlier, but stocks of many of the lines are not procurable on the open market until immediately prior to the opening of the spraying season for codlin moth in October.

If the insecticides Act were put into force and a date fixed for the lodging of guarantees which would precede the opening of the spraying season, the growers could have this information prior to procuring their supplies for the year's operations.

REPORT BY THE DIRECTOR OF CHEMISTRY (DR. W. A. HARGREAVES).

Nine samples of arsenate of lead, received on October 1st, 1923, have been analysed with the following results :—

Analyses of the Samples as received.

No.	Brand.	Moisture.	Total Lead (PbO).	Total Arsenic (As_2O_5).	Water Soluble Arsenic (As_2O_5).
		%	%	%	%
1.	Blyth's "Blue Bell." Paste	44·8	35·2	18·2	0·23
2.	A. M. Bickford & Sons, Ltd. "Aero." Powder	0·50	65 0	30·8	0·17
3.	Vreeland Chemical Co. "Electro." Powder	0·25	63·5	31·9	0·17
4	Vreeland Chemical Co. "Electro." Paste	1·5	62·2	32·1	0·19
5.	Bowker Insecticide Co. "Swift's." Paste	45 8	34·0	17·8	0·09
6.	Jacques Pty., Ltd. "Elephant." Paste...	47·2	33·3	17·4	0·35
7.	Hemingway's London Purple Co., Ltd. "Hemingway's." Paste	36·7	40·0	21·2	0·26
8.	Sherwin & Williams. "Sherwin & Williams." Powder	0·14	64·0	32·9	0·29
9.	Kil-Tone Co. "Green Cross." Powder....	0·18	65·9	30·6	0·29

Results Obtained on the Moisture Free Samples.

No.	Brand.	Total Lead (PbO).	Total Arsenic (As_2O_5).	Water Soluble Arsenic (As_2O_5)
		%	%	%
1.	"Blue-Bell." Paste	63·8	33·0	0·42
2.	"Aero." Powder	65·3	30·95	0·17
3.	"Electro." Powder	63·65	32·0	0·17
4.	"Electro." Paste	63·1	32·6	0·19
5.	"Swift's." Paste	62·7	32·8	0·17
6.	"Elephant." Paste	63·05	32·95	0·66
7.	"Hemingway's" Paste	63·2	33·5	0·41
8.	"Sherwin & Williams." Powder	64·1	32·95	0·29
9.	"Green Cross." Powder	66·0	30·65	0·29

Suspension Tests.

The samples were mixed with water in the proportions recommended by the manufacturers for use in spraying trees to destroy codlin moth caterpillars. In cases in which the label specified a minimum and a maximum quantity, the mean of the two weights was taken for the test. The result of each suspension test is expressed as the percentage of dry weight of matter in suspension calculated on the dry weight of the sample, that is, the determination is made on the dry basis. The results obtained are given in the accompanying table.

Suspension Tests.

No.	Brand.	Mean Weight Recommended for 100galls.	Equivalent Weight of Dry Matter.	Percentage remaining in Suspension after Standing—		
				5 Min.	15 Min.	30 Min.
		lbs.	lbs.			
1.	Blyth's "Blue-Bell." Paste	5	2,760	78·1	62·7	60·3
2.	A. M. Bickford & Sons, Ltd. "Aero." Powder	3	2,985	23·4	16·4	6·9
3.	Vreeland Chemical Co. "Electro." Powder	2	1,995	26·3	13·2	10·8
4.	Vreeland Chemical Co. "Electro." Paste	4½	4,432	13·0	6·0	3·2
5.	Bowker Insecticide Co. "Swift's". Paste	4	2,168	48·0	20·5	13·1
6.	Jacques Pty., Ltd. "Elephant." Paste..	5	2,640	82·2	68·8	50·4
7.	Hemingway's London Purple Co., Ltd. "Hemingway's." Paste	6	3,798	13·1	8·1	5·2
8.	Sherwin & Williams. "Sherwin & Williams." Powder	2	1,997	28·2	18·8	9·8
9.	Kil-Tone Co. "Green Cross." Powder...	2	1,996	32·1	18·0	7·4

Sample No. 4. Vreeland Chemical Co., "Electro" Paste.—This sample was in an original container but it had dried out in the jar until it had become almost air dry.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, November 21st, at the Agricultural College, Roseworthy. There were present—Mr. W. S. Kelly, Capt. S. A. White, Professor A. J. Perkins, Messrs. C. J. Tuckwell, A. M. Dawkins, W. J. Colebatch, B.Sc. (Agric.) M.R.C.V.S., Colonel J. Rowell, C.B., and the Secretary (Mr. H. J. Finnis).

Inspection.—Under the guidance of the Principal of the College (Mr. W. J. Colebatch, B.Sc. (Agric.) M.R.C.V.S.), members of the Board made a tour of inspection of the College cropping during the morning. In the afternoon the farmstead and stock came under observation.

Mallee Lands Instructor.—Further consideration was given to the resolution from Congress, urging that the position of the Mallee Lands Instructor should be filled. It was decided to make strong representation to the Hon. Minister of Agriculture to this effect.

Bird Destruction.—A communication was received from Mr. J. F. White of Macclesfield, requesting suggestions for controlling Bird Pests in Orchard Lands. It was decided that Capt. White should visit the locality in question and confer with the inquirer.

Life Membership.—The honor of life membership of the Agricultural Bureau was conferred on Messrs. S. Pratt of the Hartley Branch and A. Phelps of the Clarendon Branch, both of whom had completed 20 years' service as members of the Agricultural Bureau.

New Branch.—Approval was given to the formation of a Branch of the Agricultural Bureau at Kringin, with the following gentlemen as Foundation Members:—A. P. and W. Baldwin, P. and F. W. Morrow, J. Mathew, H. Lockhurst, W. Cornell, G. Guthleben, H. H. Menz, V. R. and F. C. Tee.

New Members.—New members were appointed as follows:—Loxton—J. G. Pfeifer, A. Hanke, B. Hanke, J. A. Seidel, C. A. Kaesler, J. P. Handtke; Moonta—A. Marsland; Rendlesham—F. V. Burchell, J. D. Moody; Paruna—E. Altman, E. Groom; Wirrabara—D. Grey; Lipson—S. R. Furnell, S. B. Blacker, C. Laurie; Eurelia—A. Schmidt, J. J. Hamilton, C. Phillas; Mount Hope—A. Vigar, Thos. Speed, jun.; Bethel—M. H. Daeke, E. G. Schmidt, E. R. Peltz, T. Fiedler; Wepowie—W. H. King, F. Hetzel; Maramai—S. A. W. Porker, J. McDonald; Cungena—J. B. Karutz, F. Williams, R. A. Adams, A. W. Taylor; Light's Pass—C. Roeburn; Kongorong—J. Bird; Wookata—E. J. Wilkens; Glossop—T. Gillespie, H. Morrell, E. R. Scott, A. Sandeman; Tarcowie—J. A. Fiirst; Port Elliot—J. P. Colebatch; Block "E"—C. A. Ritchie, W. A. Pitt, G. Smart, E. W. Williams, B. Weber, A. Woodworth, E. Pullen, H. Skelsey; Shoal Bay—R. Balchin; Kalangadoo—J. B. Hill, Geo. McDonald; Kalangadoo (Women's—Mrs. H. Rogers; Mount Barker—J. Downing; Kangarilla—F. Smart; Beetaloo Valley—T. Jones; Clare—W. H. Bond, jun.; Blackheath—

G. Nichols; Renmark—C. R. Clarke, H. Latz; Williamstown (Women's—Miss W. Cundy; Big Swamp—G. A. Klau; Yadnarie—H. W. Fitzwater; Wilkawatt— A. Steele, L. Carter; Mannanarie—L. Wehr, R Wehr, H. J. Cundy, T. Cahill; Tarlee—J. Devine, R. R. Lee, Robertson; Gumeracha—W. Noyce; Lyndoch—E. W. Bishop, L. Harper; Carrow—S. L. Bates; Collie—E. Shipard, J. Wright, R. Mills, K. Gunn, W. Cummings; Murray Bridge—G. Stephens, A. Jordan, W. Chennell, C. L. Bennett, T. G. Bennett, E. Nelson; McLaren Flat—J. C. Robertson, K. Robertson, G. Cooper, G. E. Baxendale, E. R. Martyr, A. J. Glover; Naracoorte—W. J. Dunne; Cobdogla—E. L. Hefford, A. Watkins, L. Saint, G. Carthew, N. Coombe, G. Ellis; Morchard—J. M. Davill; Parilla—R. Jacobs; Paruna—J. Radcliff, C. McDonald.

THE AGRICULTURAL OUTLOOK.

REPORTS FOR THE MONTH OF NOVEMBER.

The following reports on the general agricultural conditions and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective managers:—

Booborowie.—Weather—The weather for November in a general way has been cool, with a registration of 28 points of rain up to the time of writing. Crops—The crops are heavy, and good yields of both hay and grain should be obtained. Natural feed is very plentiful. Stock—Livestock are all in good healthy condition. Miscellaneous—Farmers are busy hay-cutting.

Eyre Peninsula.—Weather—No rain fell during this month. Weather until the last week was really too cool for harvesting, but splendid weather followed. Crops—Some crops have been harvested. Oat crops promise splendid yields, and so do some of the wheat crops. Wheat on fallow is looking particularly well, and has filled much better than other wheat. Barley is showing an average crop. Natural feed has all dried off, but there is an abundance of it. Speargrass is about 2ft. 6in. high all through the scrub. Stock all in good condition and free from disease. Pests—The cutworms in the vegetable garden are our greatest pest at present. Miscellaneous—Some farmers are commencing to talk of water shortage, and it seems that it will not be long ere they are hard at carting.

Kybybolite.—Weather has been fairly seasonable for the month. The early part of month was cool, with light rains. Strong winds were experienced during the middle of the month, followed by a period of high temperatures. About 1in. of rain was recorded, which is below the average. Crops benefited by the rains, and the spring-sown barley crops have developed well. Summer crops have germinated well, especially maize. Natural feed is plentiful.

Turretfield.—Weather—The weather has been exceptionally cool, only two or three hot days being experienced; 147 points of rain were registered. Crops have improved considerably, and a few nice cuts of hay will be made; in consequence of the wet winter and cool spring following a late sowing the harvest will be late. Natural feed has been plentiful, but is going off quickly. Stock are in good condition. Some farmers have had an epidemic of influenza amongst their horses. Pests—Rabbits are becoming numerous. Miscellaneous—The vineyards are looking well and are much better worked than last year.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, reported on December 1st, 1923:—

BUTTER.—The favorable weather experienced during the month has had the effect of prolonging the season, for the production has kept up remarkably well for this time of the year. This State's surplus butters have been placed in cold store with a view to being exported overseas, and London buyers have been in evidence operating most freely for all available quantities. As a result of the strong values ruling on the London market prices advanced 1d. per lb. as compared with last month. Choicest factory and creamery fresh bulk, 1s. 5½d.; second grade bulk, 1s. 3d. to 1s. 3½d.; best separators and dairies, 1s. 3d to 1s. 4½d ; fair quality, 1s. 2½d. to 1s. 3d.; store and collectors', 1s. 1d. to 1s. 2d.

EGGS.—Quantities marketed at each auction were large with the exception of the last two or three sales, when consignments showed a marked decrease, and as pulp manufacturers and picklers were anxiously operating for their requirements, the market advanced. Fresh hen, 1s.; duck, 1s. 1d. per dozen.

CHEESE.—Fairly large consignments were forwarded from the South-Eastern factories weekly, but the demand experienced locally readily absorbed all available, whilst only limited interstate trade was done, the range being 11d. to 12½d. for large to loaf.

HONEY.—Many apiarists advise that their take will be considerably below that of last year; no doubt this is due to the exceptionally late and boisterous winter which we have experienced. In the course of the month the new season's honey has come to hand, and buyers are giving same the preference. Last season's is therefore somewhat neglected. Values remain unaltered:—Prime clear extracted in liquid condition, 3½d. to 4d.; best candied lots, 3d. to 3½d.; lower grades, 2d. to 2½d., according to quality. Beeswax, 1s. 4½d. for clear samples.

ALMONDS.—Very large quantities have been marketed, parcels finding ready sales to interstate and local buyers at the following rates:—Brandis, 9½d. to 10d.; mixed softshells, 8½d. to 9d.; hardshells, 4½d. to 5d.; kernels, 1s. 5½d., in strong demand.

BACON.—Towards the end of the month supplies improved considerably, and buyers were in the position of being able to secure their full requirements. An easing in values took place with sides and middles, but no variation occurred in the price of hams and rolls. Best factory-cured sides, 1s. 3d.; hams, 1s. 8d.; Hutton's "Pineapple" brand hams, 1s. 9d.; middles, 1s. 4½d.; rolls, 1s. 1½d. to 1s. 2d.

LARD.—Hutton's "Pineapple" brand in packets, 1s. 1d.; in bulk, 1s.

LIVE POULTRY.—The poultry market right throughout the month continued brisk, but unfortunately supplies were not nearly equal to the demand. At each sale held buyers were in good attendance and eager to secure supplies, which resulted in most satisfactory values being obtained for consignors. Already poulterers, restaurant-keepers, &c., are anxiously purchasing stocks for their Christmas requirements, and it is anticipated in the trade that only slight fluctuations in values will occur. Crates obtainable on application. The following rates ruled at our last auction for the month:—Prime roosters, 5s. 6d. to 7s. 6d. each; nice condition cockerels, 3s. 6d. to 5s. 3d.; poor condition cockerels, 3s. to 3s. 3d.; plump hens, 4s. 6d. to 6s. 3d.; medium hens, 2s. 9d. to 4s.; some pens of weedy sorts lower. Geese, 7s. 3d. to 8s. 3d.; ducks, good condition, 6s. 6d. to 10s.; medium ducks, 4s. 6d. to 6s.; fair condition do., 2s. 11d. to 4s. 3d.; turkeys, good to prime condition, 1s. 2d. to 1s. 9d. per lb. live weight; do., fair condition, 1s. to 1s. 1½d. per lb. live weight; do., fattening sorts, lower. Pigeons, 10d. each.

POTATOES.—Since our last report the price of Victorian potatoes has eased somewhat owing to the new locals and Western Australians coming on to the market. Victorians are now realising 17s. 6d. to 18s. 6d. per cwt. and New Western Australians and locals, 17s. to 20s. per cwt. on rail, Mile End.

ONIONS.—Best quality new white onions, 10s. per cwt. on trucks, Mile End.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., OCTOBER, 1923.

IMPORTS.

Interstate.

Apples (bushels)	8,374
Bananas (bushels)	10,406
Oranges (bushels)	3
Lemons (bushels)	1
Passion fruit (bushels)	338
Pineapples (bushels)	602
Tomatoes (bushels)	2
Peanuts (packages)	1
Beans (packages)	3
Swedes (packages)	157
Onions (bags)	891
Potatoes (bags)	29,534
Bulbs (packages)	15
Plants (packages)	16
Seeds (packages)	20
Wine casks, empty (number)	3,183

Rejected—2bush. bananas, 1 package plants, 48 second-hand bags.
Fumigated—2 wine casks, 1bush. oranges.

Overseas.

Federal Quarantine Act.

Seeds, &c. (packages)	5,133

EXPORTS.

Federal Commerce Act.

Four thousand nine hundred and seventy-nine packages of dried fruit, 2,118 packages citrus fruit, 15 packages honey, and 20 packages preserved fruit were exported to overseas markets. These were consigned as follows:—

London.

Dried fruit	2,388
Citrus fruit	7
Honey	12

India and East.

Dried fruit	242
Honey	3

New Zealand.

Dried fruit	798
Citrus fruit	2,111
Preserved fruit	20

United States of America.

Dried fruit	11

South Africa.

Dried fruit	1,540

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month of and to the end of November, 1923, also the average precipitation to the end of November, and the average annual rainfall.

Station.	For Nov., 1923.	To end Nov., 1923	Av'ge. to end Nov.	Av'ge. Annual Rainfall
Far North and Upper North.				
Oodnadatta	0·05	2·10	4·64	4·93
Marree	—	3·70	5·37	6·14
Farina	—	3·35	6·08	6·73
Copley	—	5·59	7·59	8·50
Beltana	0·07	6·16	8·18	9·65
Blinman	—	8·33	11·64	12·61
Parcoola	—	2·86	7·27	7·91
Hookina	—	7·86	12·25	13·60
Hawker	0·05	10·91	12·02	12·93
Wilson	—	9·75	11·66	12·56
Gordon	—	6·78	11·73	11·60
Quorn	0·23	12·23	13·47	14·24
Port Augusta	0·53	7·45	9·11	9·68
Port Augusta West	0·52	6·99	9·06	9·74
Bruce	0·30	7·28	9·97	10·76
Hammond	0·46	11·07	12 09	11·90
Wilmington	0·32	16·66	17·48	18·44
Willowie	0·37	12·51	11·75	12·44
Melrose	0·85	26·79	21·41	23·88
Booleroo Centre	0·56	17·16	14·69	15·67
Port Germein	0 03	12 40	12·07	12·93
Wirrabara	0·94	20·25	17·75	19·85
Appila	0·60	15·38	13·99	15·01
Cradock	0·09	8·66	10·69	11·50
Carrieton	0·51	11·99	11·91	12 91
Johnburg	0·32	8·59	9·99	10·85
Eurelia	0·37	12·05	12·71	13·56
Orroroo	0·37	10·94	12·91	13·75
Nackara	—	6·18	11·30	11·85
Black Rock	0·37	13·85	11·92	12·73
Ucolta	0·30	7·05	11·24	12·10
Peterborough	0·57	14·24	12·57	13·53
Yongala	0·85	13·77	13·56	14·51
Lower North-east				
Yunta	—	3·84	8·16	8·93
Waukaringa	—	4·80	8·06	8·61
Mannahill	—	4·28	7·97	8·79
Cookburn	—	4·10	7·67	8·42
Broken Hill, N.S.W.	0·03	6·87	9·16	10·08
Lower North.				
Port Pirie	0·12	12·72	12·79	13·55
Port Broughton	0·24	14·62	12·63	14·27
Bute	0·31	17·40	15·05	15·80
Laura	0·92	20·44	17·32	18·25
Caltowie	0·82	18·18	16·18	17·19
Jamestown	1·08	20·71	16·80	17·86
Bundaleer W. Wks.	0·43	18·78	17·91	18·05
Gladstone	0·63	21·69	15·39	16·22
Crystal Brook	0·47	15·24	15·04	15·93
Georgetown	0·44	20·74	17·56	18·50
Narridy	0·26	14·76	16·51	16·43
Redhill	0·28	15·79	17·22	16·93

Station	For Nov., 1923.	To end Nov., 1923	Av'ge. to end Nov	Av'ge Annual Rainfall
Lower North—*continued.*				
Spalding	0·24	15·16	18·95	20·41
Gulnare	0 41	18 22	18·26	19·34
Yacka	0·53	15·18	14·61	15·45
Koolunga	0·33	14·85	15·36	15·87
Snowtown	0·19	14·47	15·32	16·05
Brinkworth	0·23	15·97	15·35	16·26
Blyth	0·16	17·11	15·98	16·96
Clare	0·35	28·57	23·56	24·60
Mintaro	0 52	30·60	22·38	23·40
Watervale	0·49	29·76	26·43	27·44
Auburn	0·41	26·02	23·25	24·30
Hoyleton	0·10	16·62	16·99	17·85
Balaklava	0·18	15·10	15·34	15·91
Port Wakefield	0·07	12 30	12·65	13·29
Terowie	0·47	11·16	12·73	13·78
Yarcowie	0·06	9 95	13·32	14·18
Hallett	0 39	16·39	15·44	16·47
Mount Bryan	0·29	20·08	15·65	16·74
Kooringa	0·49	16·39	17·15	18·06
Farrell's Flat	0·32	20 61	18·05	18·97
West of Murray Range.				
Manoora	0·69	23·16	16·77	18·78
Saddleworth	0 62	22·16	18·77	19·74
Marrabel	0·56	26·78	18·80	19·67
Riverton	0·52	27 15	19·87	20·71
Tarlee	0·59	26·20	17·02	17·81
Stockport	0·39	24·40	15 74	16·49
Hamley Bridge	0·36	23·55	15·66	16·52
Kapunda	0·54	25·44	18·92	19·80
Freeling	0·42	24 36	17·04	17·90
Greenock	0·65	30·23	18·67	21·60
Truro	0 95	27·54	18·21	20·80
Stockwell	0·79	27·68	19·30	20·31
Nuriootpa	0·58	25·28	19·90	20·99
Angaston	0·93	28·87	21·39	22·48
Tanunda	0·95	29·60	21·21	22·20
Lyndoch	1·03	38·12	21·91	22·88
Williamstown	1·10	38·66	26·34	27·47
Adelaide Plains.				
Mallala	0·29	22·70	15·49	16·66
Roseworthy	0·21	21·38	16·49	17·29
Gawler	0·61	25·52	18·21	19·09
Two Wells	0·10	20·37	15·05	15 83
Virginia	0·15	23·29	16·31	17·31
Smithfield	0·23	26·12	16·35	17·16
Salisbury	0·23	29·01	15·38	18·45
North Adelaide	0·55	30·85	21·17	22·22
Adelaide	0·46	27·06	20·09	20·05
Glenelg	0·46	23·75	17·57	18·37
Brighton	0·37	25·51	20·18	21·34
Mitcham	0·75	32·65	23·74	24·06
Glen Osmond	0·87	36·39	24·71	25·78
Magill	0·62	38·54	24·04	25·24

RAINFALL—*continued.*

Station.	For Nov., 1923.	To end Nov., 1923.	Av'ge. to end Nov.	Av'ge. Annual Rainfall
Mount Lofty Ranges.				
Teatree Gully.....	0·89	40 25	26 36	27·65
Stirling West	1·99	62·22	44·59	46·59
Uraidla	1·89	60·00	42·30	43·92
Clarendon	1·05	40·61	31·63	32·98
Morphett Vale ...	0·54	27·12	21·90	22·79
Noarlunga	0·52	26·22	20·61	20·35
Willunga	0·73	31·27	25·00	25·89
Aldinga	0·63	23·68	19·71	20·35
Myponga.....	0·76	32·98	28·58	29·16
Normanville	0·48	26·12	21·89	20·61
Yankalilla.....	0·55	29·70	22·36	23·10
Mount Pleasant ..	0·84	39·64	26·16	27·16
Birdwood	1·15	41·27	28·10	29·33
Gumeracha	1·32	49·37	29 24	33·29
Millbrook Reservoir	1·18	51·12	—	—
Tweedvale	1·56	51·60	34·22	35·55
Woodside	0·82	42·52	30·88	32·11
Ambleside.....	1·09	47·53	33·35	34·67
Nairne	0·80	33·25	27·28	28·42
Mount Barker	1·65	44·24	30·01	31 18
Echunga	1·37	45·05	31·75	32·96
Macclesfield	1·03	38·16	29·42	30·57
Meadows	1·44	46·13	34·69	36·04
Strathalbyn	0·55	19·48	18·50	19·32
Murray Flats and Valley.				
Meningie	0·52	22·00	17·90	18·66
Milang	0·27	14·08	16·56	15·40
Langhorne's Creek.	0·55	17·53	14·00	14·61
Wellington	0·41	14·43	14·01	14·77
Tailem Bend	0·50	16·15	13·81	14·55
Murray Bridge ...	0·33	13·11	13·17	13·93
Callington	0·49	16·65	14·71	15·42
Mannum	0·20	10·16	11·07	11·64
Palmer	0·18	16·68	14·70	15·47
Sedan	0·26	13·37	11·72	12·29
Swan Reach	—	9·73	10·36	11·09
Blanchetown	—	5·05	9·47	10·16
Eudunda.....	0·47	17·12	15·62	17·54
Sutherlands	0·33	11·64	10·52	11·19
Morgan	—	6·77	8·55	9·30
Waikerie	—	6·89	9·09	9·91
Overland Corner ..	—	6·04	10·26	11·07
Loxton	0·11	9·71	11·88	12·63
Renmark	—	7·58	11·21	11·09
Monash	—	—	—	—
West of Spencer's Gulf.				
Euola.....	0·02	5·11	9·94	10·02
White Well.....	—	5·04	8·60	9·08
Fowler's Bay	0·27	12·13	11·83	12·16
Penong	—	12·64	12·06	12·49
Ceduna	—	9·56	9·77	10·36
Smoky Bay	0·05	12·93	10·43	—
Petina	0·07	13·68	12·47	13·34
Streaky Bay.....	0·09	14·64	14·64	15·10

Station.	For Nov., 1923.	To end Nov., 1924.	Av'ge. to end Nov.	Av'ge. Annual Rainfall
West of Spencer's Gulf—*continued.*				
Talia	—	15·61	14·58	16·45
Port Elliston	0·14	18·85	16·05	16·55
Cummins	0·12	20·21	17·86	18·90
Port Lincoln	0·20	18·88	18·99	19·72
Tumby	0·17	12·40	13·74	14·76
Carrow	—	11·65	13·66	14·18
Arno Bay	—	11·03	12·45	13·30
Cowell	—	7·11	11·22	11·75
Yorke Peninsula.				
Wallaroo	0·42	14·72	13·57	14·18
Kadina	0·44	17·46	15·38	16·05
Moonta	0·56	16·60	14·68	15·38
Green's Plains	0 26	18·63	15·22	18·89
Maitland	0·44	25·27	19·36	20·15
Ardrossan	0·17	16·62	13·64	14·11
Port Victoria	0·16	20 09	13·94	15·47
Curramulka	0·23	20·62	17·50	18·22
Minlaton	0·27	23·33	17·26	17·91
Brentwood	0·22	19·76	15·14	15·83
Stansbury	0·10	21·94	16·30	17·04
Warooka	0·24	25·50	17·22	17·81
Yorketown	0·12	21·05	16·95	17·26
Edithburgh	0 22	21·13	15·95	16·58
South and South-East.				
Cape Borda.....	0 26	24·93	24·28	25·10
Kingscote	0·13	21·49	18·30	19·10
Penneshaw	0·13	17·08	17·87	19·39
Victor Harbor	0·54	20·91	20·63	21·45
Port Elliot	0·63	20·09	20·31	20·26
Goolwa	0·28	15·79	17·14	17·87
Pinnaroo	0·28	16·64	14·68	15·66
Parilla	0·66	16·29	13·70	14·65
Lameroo	0·80	18·17	15·33	16·37
Parrakie	0·65	16·62	13·74	14·54
Geranium	0·59	18·32	15·68	16·19
Peake	0·63	17·18	15·82	16·58
Cooke's Plains ...	0·40	20·03	14·37	15·04
Coomandook	0·34	16·57	16·71	17·48
Coonalpyn	0·57	19·66	16·50	17·42
Tintinara	0·79	21·75	17·63	18·60
Keith.....	0·71	20·21	17·21	18·17
Bordertown	0·79	21·11	18·31	19·44
Wolseley	0·95	23·03	17·29	18·12
Frances	1·22	23·89	18·48	19·78
Naracoorte	0·75	24·35	20·92	22·52
Penola	1·56	31·51	24·91	26·29
Lucindale	1·16	25·55	21·83	22·95
Kingston.....	0·73	24·05	23·94	24·47
Robe	0·62	24·07	23·67	24·59
Beachport.....	0·89	22·72	26·09	20·24
Millicent	1·86	33·87	29·14	29·36
Kalangadoo	2·67	37·66	—	—
Mount Gambier ..	1·65	28·95	29·46	31·24

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings	
		Dec.	Jan.
Alawoona	*	—	—
Aldinga	*	26	—
Allandale East	506	20	—
Amyton	*	26	21
Angaston	*	—	—
Appila-Yarrowie	*	—	—
Arthurton	*	—	—
Ashbourne	‡	—	—
Balaklava	*	8	12
Balhannah	‡	21	18
Barmera	*	17	21
Beetaloo Valley	480	17	21
Belalie North	*	—	19
Berri	*	22	23
Big Swamp	‡	—	—
Blackheath	‡	21	25
Black Springs	‡	—	—
Blackwood	‡	17	21
Block E	*	—	—
Blyth	‡	1	—
Booleroo Centre	*	21	18
Borrika	*	—	—
Brentwood	*	20	17
Brinkley	‡	22	19
Bundaleer Springs	484	—	—
Bute	*	18	22
Butler	500	—	—
Calca	*	—	—
Cadell	*	—	—
Canowie Belt	*	—	—
Carrow	500	17	16
Cherry Gardens	501	18	22
Clanfield	*	—	—
Clare	486	—	—
Clarendon	*	17	21
Claypan Bore	*	—	23
Cleve	*	19	16
Collie	500	—	—
Colton	*	28	25
Coomandook	*	19	16
Coonalpyn	*	21	25
Cradock	*	—	—
Crystal Brook	*	22	19
Cungena	490	—	—
Currency Creek	‡	21	25
Cygnet River	*	20	17
Darke's Peak	492	—	—
Denial Bay	*	—	—
Edillilie	*	31	26
Elbow Hill	*	25	29
Eurelia	479, 480	—	—
Farrell's Flat	‡	21	—
Frances	*	R	R
Gawler River	*	24	21
Georgetown	*	22	19
Geranium	501	29	26
Gladstone	*	21	18
Glencoe West	*	—	—
Glossop	501	19	16
Goode	500	26	23
Green Patch	‡	17	21
Gumeracha	‡	24	21
Halidon	*	—	—
Hartley	502	19	—
Hawker	*	24	22
Hilltown	*	—	—
Hookina	479	20	17
Inman Valley	*	—	—
Ironbank	*	22	19
Kadina	*	—	—
Kalangadoo (Women's)	512	8	12
Kalangadoo	‡	8	12
Kangarilla	‡	21	18
Kanmantoo	*	22	19
Keith	*	—	—
Ki Ki	*	—	—
Kilkerran	488	20	17
Kimba	*	—	—
Kingston-on-Murray	*	—	—
Kongorong	508	17	17
Koonibba	*	21	18
Koppio	493	17	21
Kybybolite	*	R	R
Lake Wangary	500	22	19
Lameroo	*	21	25
Laura	484	22	19
Lenswood and Forest Range	*	—	—
Light's Pass	484, 486	20	—
Lipson	500	—	—
Lone Gum and Monash	*	19	16
Lone Pine	‡	22	—
Longwood	502, 505	—	—
Loxton	*	—	—
Lucindale	*	—	—
Lyndoch	486	20	17
McLachlan	‡	1	—
McLaren Flat	‡	—	—
MacGillivray	503	18	22
Maitland	*	20	17
Mallala	*	17	21
Maltee	500	21	18
Mangalo	*	—	—
Mannanarie	‡	—	—
Marama	501	R	R
Meadows	*	19	16
Meningie	*	—	—
Milang	*	8	12
Millicent	510	1	5
Miltalie	494	22	19
Mindarie	*	3	7
Minlaton	*	21	18

INDEX TO AGRICULTURAL BUREAU REPORTS—*continued.*

Branch.	Report on Page	Dates of Meetings. Dec.	Jan.
Minnipa	*	19	16
Monarto South	*	—	—
Moonta	488	21	R
Moorak	*	20	17
Moorlands	*	—	—
Moorook	501	—	21
Morchard	479	R	R
Morphett Vale	*	R	R
Mount Barker	506	19	16
Mount Bryan	*	—	—
Mount Byran East	*	—	—
Mount Compass	*	—	—
Mount Gambier	‡	8	12
Mount Hope	496	R	R
Mount Pleasant	506	—	—
Mount Remarkable	*	—	—
Mount Schank	*	25	22
Mundalla	*	19	16
Murray Bridge	501	—	—
Mypolonga	501	19	16
Myponga	*	—	—
Myrla	*	22	19
Nantawarra	‡	20	17
Naracoorte	510	8	12
Narridy	*	22	19
Narrung	*	22	19
Neeta	*	—	—
Nelshaby	482	22	19
Netherton	501	R	R
North Booborowie	‡	R	R
North Bundaleer	*	—	—
Northfield	*	—	—
Nunkeri and Yurgo	*	3	6
O'Loughlin	*	19	16
Orroroo	*	—	—
Owen	486	21	18
Parilla	‡	R	R
Parilla Well	*	24	21
Parrakie	*	—	—
Paruna	501	R	R
Paskeville	490	21	18
Pata	*	—	—
Penola	‡	1	2
Petina	*	22	26
Pinnaroo	*	R	R
Pompoota	*	12	9
Port Broughton	*	21	18
Port Elliot	506	19	16
Port Germein	*	30	26
Pygery	496	22	19
Ramco	‡	R	21
Rapid Bay	504	1	5
Redhill	§	—	—
Rendelsham	511	19	16
Renmark	‡	20	17
Riverton	*	—	—
Riverton (Women's)	*	—	—
Roberts and Verran	500	20	17
Rockwood	504	17	21
Rosedale	*	—	—
Rosy Pine	*	—	—
Saddleworth	*	—	—
Saddleworth (Women's)	487	11	8
Salisbury	487	4	1
Salt Creek	*	—	—
Sandalwood	*	—	—
Shoal Bay	506	18	—
Smoky Bay	*	—	—
Spalding	*	—	—
Stockport	‡	R	—
Streaky Bay	‡	—	—
Strathalbyn	‡	18	22
Talia	*	10	14
Tantanoola	*	22	19
Taplan	*	18	22
Tarcowie	482	R	22
Tarlee	‡	R	R
Tatiara	512	15	19
Tweedvale	*	—	—
Two Wells	*	—	—
Uraidla & Summertown	*	3	7
Veitch	*	—	—
Virginia	*	—	—
Waikerie	*	—	—
Wall	*	—	—
Wanbi	*	—	—
Warcowie	‡	—	—
Watervale	*	—	—
Weavers	*	17	21
Wepowie	*	R	R
Whyte-Yarcowie	‡	—	—
Wilkawatt	*	22	19
Williamstown (Women's)	487	5	2
Williamstown	487	21	18
Willowie	*	19	16
Wilmington	*	19	16
Windsor	*	—	—
Winkie	*	17	—
Wirrabara	482	22	—
Wirrega	*	—	—
Wirrilla	*	22	19
Wirrulla	‡	—	—
Wolowa	*	—	—
Wookata	497	22	—
Wudinna	*	—	—
Wynarka	*	—	—
Yacka	*	18	22
Yadnarie	498	18	22
Yallunda Flat	*	—	—
Yaninee	*	—	—
Yeelanna	*	22	19
Yongala Vale	*	—	—
Yorketown	*	—	—
Younghusband	*	22	24

* No report received during the month of November. ‡ Held over until next month. § Formal.
R. Recess.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

EURELIA.

September 14th.—Present: eight members and visitors.

FALLOWING.—The following paper under the heading "Fallowing and the Working of It," was contributed by Mr. C. Stott:—"One of the most important points in connection with the work of fallowing is to see that each share of the plough is cutting the correct width of land. A depth of 3½in. to 4in. I consider to be about the right depth for this district. I believe in harrowing immediately after the plough, when the fallowing is done at this time of the year, because this will assist the soil in retaining moisture and allow the weeds to germinate. If possible, the farmer should endeavor to cross-cultivate and harrow in order to reduce the soil to a level surface. I believe in cultivating to a fair depth to make the fallow mellow and keep it in good order. A disc cultivating plough is the most suitable implement for working the soil when it is in a dry condition, because it will pulverise the ground and assist in the retention of the moisture. Another advantage with the disc is that with a good team the farmer can average 50 acres per week."

HOOKINA (Average annual rainfall, 12in.).

October 25th.—Present: nine members and two visitors.

COLT BREAKING.—Mr. R. Wardleworth read a paper from the *Journal of Agriculture* dealing with this subject, and in the discussion that followed, Mr. B. A. Murphy said he favored a strong yard and crush-pen for handling the colt, in preference to a rope, and thought the horse should first be educated with one rein instead of two as suggested in the paper. He said the best way to teach a horse to pull was to hitch it to a log. Mr. J. Murphy thought it was always advisable to tie a young horse to an old one when the former was introduced to the team. Mr. H. V. Henschke thought the colt should be worked in a plough or scoop in order that it would become accustomed to the chains rubbing against its body and legs. Mr. P. Kelly said an application of salt water on the shoulders of the young horses, after the collar was taken off, was an excellent preventive of sore shoulders. Mr. S. Stone said if the colt were hobbled every night for some little time so that it could be caught easily next morning, it would never be any trouble to catch.

MORCHARD (Average annual rainfall, 13.50in.).

October 6th.—Present: 10 members.

CARE OF FARM MACHINERY.—The monthly meeting of the Branch was held at Mr. H. A. Toop's residence. An enjoyable afternoon was spent in inspecting the stock, implements, and farm buildings after which tea was provided by Mrs. Toop. The meeting was continued in the evening, when Mr. B. S. McCallum read an extract from the *Journal of Agriculture*, "Farming as a Business." A paper dealing with the subject, "Care of Farm Machinery," was then read by Mr. S. Davill, in the course of which he stated that the subject was one which should receive more attention than it did at the present time. Farmers were

frequently heard to say that they did not have sufficient time to adjust the machines properly, but he had found that five minutes spent in some simple adjustment would often save days of waiting for duplicate parts. There was no doubt that wire was of great value in case of emergency but it was very often noticed that when wire was used in place of a bolt or screw, it remained there for the rest of the season, and in some cases during the whole life of the machine. All machinery that was in danger of being affected by sun and rain when exposed to the weather should be kept under cover when not in use. Exposure to the weather for one season would do more harm than many years of actual work. An occasional coat of good paint was an excellent thing for any machine, especially one that contained wood and sheet iron. Every machine should be thoroughly overhauled before it was put to work in the field and should receive some little attention from day to day. Care should be taken to see that every bearing received a sufficient quantity of oil, especially machines that had a number of slow-moving parts. An interesting discussion followed.

EURELIA, October 12th.—Mr. G. Wheadon read a paper "Nitrogen and its Value," and an interesting discussion followed. Messrs. W. Canny and C. Stott gave a report of the proceedings of the Annual Congress.

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

BEETALOO VALLEY (Average annual rainfall, 23.50in.).

September 24th.—Present: 13 members and two visitors.

FEEDING AND CARE OF LIVESTOCK.—Mr. E. H. Pearce read the following paper:—"To raise and feed livestock successfully in our district it is necessary to resort to more hand-feeding than is the customary practice. A larger area of barley should be sown for early feed, and a portion of the stubble sown with oats could be utilised in the same way. Oats when crushed make good feed for horses, cattle, or sheep, and if mixed in the chaff assist in conserving the hay-stack, which is too often on the small side. Plenty of water should always be available for all classes of stock. A good strawstack, in addition to providing shelter for the stock from the cold winds, would also be something dry for them to chew in wet weather. Hand-feeding should be started whilst the animals are in good condition, rather than allowing the stock to 'fall away' before they are given supplementary fodder. The dairy cow must have an allowance of grain if she is to give profitable yields. Sheep can be more profitably carried in our district if we adopt artificial feeding when feed is scarce, rather than putting them in the market and selling for what they will fetch. To obtain the best returns from pigs they should be fed with crushed grain, and in wet weather it is a good plan to give them a warm feed especially for the evening meal, and if given a warm place with a good straw bed on which to sleep, they will be a profitable source of revenue, rather than the underfed, stunted runts we see running about some farms. I favor cooking the food for pigs and steaming that which is fed to cows, in order to get the best results. Fowls should be housed in a dry place, free from draughts, and fed regularly night and morning, and if possible at midday."

BEETALOO VALLEY (Average annual rainfall, 23.50in.).

October 22nd.—Present: 12 members and three visitors.

POULTRY RAISING.—In the course of a paper dealing with this subject Mr. C. Cox said the main points that should be taken into consideration in poultry raising were the selection of a good breed and the careful management of the birds. The speaker expressed a preference for Black Orpingtons. They were good winter layers, good sitters, and good mothers. They were also very quiet. The main factor in the successful management of the flock was cleanliness in the roosting-houses, coops, and drinking vessels. To keep vermin, such as lice and tick, under control, the houses, &c., should be sprayed with disinfectant once in every four weeks. When setting a hen it was advisable to sprinkle her feathers

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with insect powder, or, if procurable, some leaves of the tobacco plant should be placed in the nest to keep the insects from disturbing the hen whilst she was sitting. He favored hatching the chicks with the hen, because with that method healthier chickens were obtained, and they were less trouble to rear. All misshapen, double-yolked, and soft-shelled eggs were useless for hatching. The chicks should be hatched in August and September, so that the birds would finish moulting before the commencement of the cold weather. If the hen had scaly legs she would transmit the disease to the chicks, but an application of kerosene and lard would cure the complaint. All poultry should be housed at night to secure them from foxes. Crushed grain or bran and pollard should be fed to the young chickens three times a day, but when the birds were four to five weeks old two feeds a day would be sufficient. The writer's pen of Black Orpington fowls, which numbered 23, laid 2,016 eggs from April 1st, 1922, to March 31st, 1923, and the same hens hatched and raised 100 chickens.

NELSHABY.

August 25th.—Present: 17 members and visitors.

Mr. A. Bam gave a report of the proceedings of the Winter School for Farmers which he had attended at Roseworthy Agricultural College.

A further meeting was held on September 11th when a paper, "Drill v. Combine," was read by Mr. A. Loch, in the course of which the reader stated that he had used the combined implement and had found it efficient if worked properly. It was a labor-saver and also required fewer horses than the drill and cultivator worked as separate implements. In discussing the paper Mr. T. D. Haines favored the combine. He found that the wheat came up more quickly after the combine than when the separate implements were used. Mr. F. Jose had used the combine with satisfactory results. He found the sandy land did not drift so readily after the combine, and with that implement one was also able to commence work earlier after a damp morning than with the drill. Mr. Noble had found the draught light, and that the combine would go through a considerable amount of rubbish. He thought it an ideal implement for a one-man farm. Other members also expressed opinions in favor of the combine.

TARCOWIE (Average annual rainfall, about 15½in.).

October 1st.—Present: 14 members.

Mr. G. H. Watkins read a paper, "F.A.Q. Wheat Standard," in which he contended that the grading of wheat under the F.A.Q. standard was not satisfactory to the honest wheatgrower, because it permitted practically any kind of a sample except that of very smutty grain to pass the standard. Mr. J. Ninnes concurred with the views expressed by the writer of the paper. Mr. D. Smith was of the opinion that if the farmer improved his seed and kept it free from all rubbish, he would obtain a higher price, and at the same time improve the standard of Australian wheats. Mr. W. S. Ninnes thought the introduction of bulk handling would be a step in the interests of the wheatgrowers of the State.

WIRRABARA (Average annual rainfall, 18.91in.).

September 22nd.—Present: 12 members and two visitors.

CLEARING TIMBERED LAND.—The following paper was read by Mr. E. B. Pitman:—"To bring heavy-timbered land under cultivation it is necessary to have a machine to pull the trees, and as many roots as possible, out of the ground. In this paper, however, I intend to deal mainly with that class of country where the timber is more or less scattered. I would first of all utilise those trees that are suitable for splitting into posts, shed forks, rails, &c., whilst the tops could be used for firewood. The boughs should be stacked around the stumps and burned. The presence of stumps and stones on land that is under cultivation is a hindrance to the thorough working of the soil. All large stones should be picked off and carted to creeks and gullies, where they will do good in helping to prevent flood waters from washing away the banks. If there are no creeks into which to tip the stones, they can be carted to the boundary fences. On no account should heaps of stones be made at the butts of trees, because if the trees have to be removed at any time, it will necessitate a second handling of the stones.

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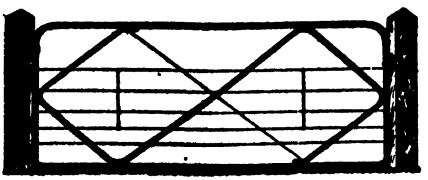


Fig. 201.—Cyclone "Z" Gate.

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Again, it is not a good plan to tip the stones on any except the very worst reefs, because even if you do not intend some day to clean out the reef, it is quite possible that the next man will want to do so. When the stones are once in the dray it only requires a few extra minutes to get them to the outside edge of the paddock. Short reefs which often jut out of the land should be cleared out in order to save the extra turning of the team. Small stones are best dealt with by means of a stonerake, when they can be forked into a dray from the rows left by the rake. During the last 20 years or so I have seen and tried many different ways of getting the land free of stumps, and I have come to the conclusion that the best plan to adopt is the following procedure:—The work is best carried out during the early autumn when the stump and material are both dry from the summer heat. Cover the stump with dry stable manure, put a match to it, and go on to the next stump and treat it in the same manner. If some of the surface soil is removed from around the stumps it will make a better job of the burning. Fine dry manure burns downwards and very rarely flares, so that the work can be started early in the season without the risk attached to other methods of burning off. Green stumps may need a second or third application, but the first burn will kill them and they will then be dry enough for the next season. Big solid stumps may burn for up to six weeks or more, but they will go to ashes if kept alight.''

BUNDALEER SPRINGS, October 24th.—Eighteen members of the Branch paid a visit to the Beetaloo Valley Bureau and took part in an enjoyable tour of inspection of the district.

LAURA, September 25th.—Mr. H. R. Lines read an article dealing with the work of breeding rust and drought-resistant varieties of wheat, and the report of the delegates who attended the Annual Congress was received and discussed. The subject, ''The Maintenance of Soil Fertility,'' was also brought forward for discussion.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

LIGHT'S PASS.

September 27th.—Present: 17 members.

SPRAYING FOR BLACK SPOT OF THE VINE.—In the course of a paper dealing with the subject, Mr. S. Ellis said swabbing vines affected with black spot had been tried, but whilst it gave a temporary check to the spead of the disease, the fungus again made an appearance on the vines when they made further growth. The cheapest and most effective method of dealing with the trouble he considered to be spraying with Bordeaux or Burgundy mixture. Bordeaux mixture used before the flowering of the vines should be made as follows:—Bluestone, 6lbs.; fresh lime, 4lbs.; and water, 50galls. For spraying after the flowering of vines he suggested:—Bluestone, 5lbs.; fresh lime, 5lbs.; and water, 50galls. The Burgundy mixture, which should be used only up to the flowering stage, should be made with the following:—5lbs. of bluestone and 6lbs. of soda dissolved in 50galls of water. Although Burgundy had given good results, there was a danger of it burning the foliage during the hot weather, and it washed off the vines should a rain follow its application. The most important point in the control of the disease was to see that the vines were treated at the correct time. If the vineyard had been severely attacked during the previous season and no steps had been taken to check the disease, he advised spraying before the bursting of the shoot buds, but if the rods left from the previous season were free from black spot, spraying would be unnecessary. When the shoots appeared a careful watch over the vines should be exercised, and on the first signs of the disease the vines should be sprayed, but if no spot appeared, spraying could be left until immediately before the bursting of the buds. After the flowers had set another inspection of the vines would be necessary, especially after showery or muggy weather, and if traces of the disease were in evidence the vines should be sprayed as occasion demanded, up till the first week in January. Should the

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season be one suitable to the spread of the fungus, he advised one spraying just before flowering and another two or three weeks later. If, however, the disease did not put in an appearance too early and did not spread very rapidly, one spraying, applied just before flowering or soon after the fruit had set, would be quite sufficient to check black spot. On no account should spray be applied during very hot weather. The vines should be given a thorough wetting, covering all the foliage and under the bunches of fruit. The nozzle should be directed by hand and not by a fixed boom, as was adopted by some growers. The best machine for applying the spray was a motor-driven pump that would maintain an even pressure of not less than 125lbs., and reach 150lbs. when the foliage was very dense. In spur vines and when two hoses were used, two rows could be finished at the same time, but in a double-wired trellis where the foliage was dense, it was better to spray each side of the row. For the smaller grower, a good hand-pump with one hose would prove quite satisfactory, provided the machine was able to register a good pressure and disperse a fine spray. He did not consider the use of a boom in the spraying outfit to be at all satisfactory. The amount of spray required for one spraying of spur vines would be about 100 to 120 gallons, and in the double-wired trellis, from 200 to 220 gallons per acre. On reckoning two men for spraying at 11s. per day, and a boy to drive at 8s. per day, and the materials required for the work, the cost of treating spur vines would be about 9s. or 10s. per acre, and 18s. to 20s. for vines on a double-wired trellis. These costs would, of course, be considerably reduced where the grower did not have to employ outside labor. The gain in spraying vines for black spot was great; an extra 2cwts. of grapes per acre in the spur vines and 4cwts. in the double trellis, would cover the cost of one spraying, allowing the price of fresh fruit at £6 per ton.

LIGHT'S PASS.

October 25th.—Present: 18 members.

SEED SELECTION AND CROSS FERTILIZATION.—In the course of an address dealing with this subject Mr. S. Plush pointed out that very careful selection of seed was necessary in order to obtain the best results. An interesting experiment in this connection was cited by Mr. Plush. Taking a certain variety of apple, he selected the plumpest and most healthy seeds and also the poorest seeds which showed signs of least development. Planting these in separate plots and tending each with an equal amount of care, he found that much better results were obtained from the better class of seeds. A larger and a better apple was the result from the best seeds selected, whilst those coming from the poorer class of seeds deteriorated and produced very small and stunted fruit. Mr. Plush also explained how cross-fertilization and pollenization was carried on in the selection of seed wheat. Each member cited various experiences, and the observations that were brought forward tended to point out that careful selection of the best class of seed was necessary in order to secure the best results.

CLARE, September 21st.—The report of the delegates to the Annual Congress was received and discussed. Mr. H. W. Moss then gave a short address in which he dealt with the cost of operating a tractor.

A further meeting was held on October 19th. Mr. R. J. Hague initiated a discussion on the subject, "Horses v. Tractor." Members were of the opinion that so far as local conditions were concerned, the tractor could only be regarded as an experiment, but in all probability mechanical power would be used more extensively in the near future. It was considered, however, that for hoeing, &c., horses would be more suitable than the tractor.

LYNDOCH, October 25th.—The Government Poultry Expert (Mr. D. F. Laurie) attended the meeting and delivered an address, "The Poultry Industry."

OWEN, October 17th.—Mr. R. C. Scott (Experimentalist, Roseworthy Agricultural College) attended the meeting and delivered an address, "Rotation of Crops."

SADDLEWORTH (WOMEN'S), September 18th.—A Homestead Meeting was held at Mrs. Garrett's residence. The report of the delegates to the Annual Congress was received, and discussion of the matter of staging an exhibit for the forthcoming local Show was also brought before the meeting.

SADDLEWORTH (WOMEN'S), October 9th.—Eight members and visitors attended the October meeting of the above Branch when a paper, "Domestic Insects and Pests," was read by the Hon. Secretary (Miss H. G. Coleman).

SALISBURY, September 4th.—The Hon. Secretary (Mr. A. W. Urlwin) read a paper, "The Work of the Agricultural Bureau."

At a further meeting held on October 2nd the report of the delegates who attended the Annual Congress was received and discussed.

WILLIAMSTOWN (WOMEN'S), September 5th.—Mrs. E. Haworth contributed a paper, "The Danger of the Fly."

At a further meeting held on October 4th Mrs. Wild read an instructive paper, "Hybridising Roses," and at the conclusion of the meeting distributed a number of rose seedlings amongst the members.

WILLIAMSTOWN, October 19th.—Eighteen members and several visitors attended the October meeting, when Mr. A. Springbett contributed a paper, "The Best Method of Planting the Vine," and demonstrated several of the points of the paper with the aid of the blackboard.

WILLIAMSTOWN, October 25th.—The Government Poultry Expert (Mr. D. F. Laurie) attended the meeting and delivered an address, "The Poultry Industry."

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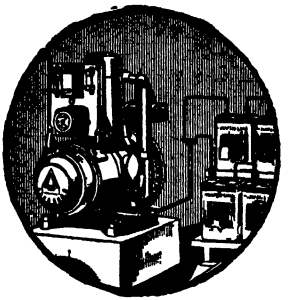
September 25th.—Present: eight members and four visitors.

FENCING.—The following paper was contributed by Mr. B. A. Koch:—"In the erection of a permanent fence the main factor to consider is the strainers. These posts should be of good solid timber, or preferably of iron or steel; a 60lb. railway rail makes a very good strainer, and is no more expensive than a sawn wooden post. These posts should, if possible, be placed in concrete, in order to prolong the life of the wooden post and to make the steel post stand more firmly in the ground. The next item demanding attention is to place a good strut against the post to keep it from shifting when the wires are being strained. These struts should be of iron or steel; one end should be placed about half-way up the post, with the other end bedded in concrete, and a heavy stone at the base. Next, a long pole should be placed against the end post at one end of the line. This post should be visible from the other end, and a peg should then be placed about four or five chains from the latter end, exactly in line with the end posts. The posts should then be placed in line with this peg and the pole at the other end. When the first peg is reached another peg is put in line with this one and the pole at the other end. Always erect the posts according to the pegs. These posts could be from about 20 yards to two chains apart, according to the kind of stock kept and the position of the fence. The barb wires should be of 12 gauge and two in number. These wires should be strained as tightly as the wire will permit without breaking. While the barb wires are being strained they should be lifted off the ground by some means. I generally use iron posts tied together in the form of the letter X. These are placed underneath the wire sloping well away from the place from which the wire is being strained. As the wire is tightened the posts stand up and lift the barb off the ground. So soon as the barb wire is tight enough it should be pegged to the posts. All posts should be bored before they are erected, because this work can then be done with machinery, which saves a lot of time and labor. So soon as the barb wires are in position the iron posts can be driven in. These should be of heavy type and should not be more than 11ft. apart. Two flat iron posts, then one heavy T post placed alternatively, make a very good fence. For a sheep-proof fence six wires are necessary—the first set about 6½in. from the ground, then two 5in., two 6in. and 9in. at the top. For plain wires I prefer No. 8 gauge galvanized wire. Wires should in no case be put through a wooden post, but always around the end, and stapled to other posts. To prevent unwinding and breaking at the end posts, a half-hitch should be made after taking the wire around, and the end finally twisted around the strained wire. New or steel wire should always be used for splicing old iron wire, and for tying at the end of posts. All ends should be cut off short, which gives the work a neat appearance, and if old staples are taken off second-hand barb wire, it will also improve the fence. I would erect the strainer posts according to the length of the line, say up to 30 chains apart." In the discussion that followed Mr. C. Hienrich favored long strains. Mr. B. J. Koch in erecting the fence made a practice of first erecting the end post, and then straining the barb wire, and from that a straight line would be obtained by which the other posts could be placed in position. Mr. S. T. Keightly thought 10 chains quite long enough for the length of a strain. Where the fence had to be erected in sandy soil he made a practice of leaving the wooden posts about 1ft. longer than was necessary, so that if at any time the sand drifted over the lower wires, fresh holes could be bored into the top portion of the posts, the wires raised, and the fence brought to the desired height.

MOONTA (Average annual rainfall, 15.22in.).

September 22nd.—Present: 18 members and visitors.

POULTRY.—The following paper was read by Mr. F. Trennery:—"It is a recognised fact that farmers do not take care of their fowls, nor do they give them the necessary treatment chiefly because they do not realise what a payable proposition poultry is as a side line on a wheat-growing farm. I consider that the



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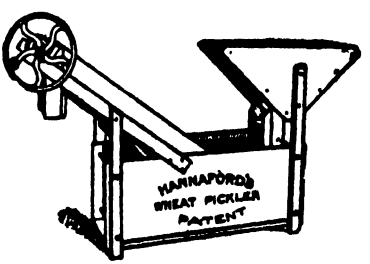
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majority of farmers lose from one year to another 20 fowls because the birds have been allowed to roost on the implements, in trees, and are totally unhoused and left to the mercy of foxes, which at certain times of the year are very destructive in this district. Twenty fowls valued at 2s. 6d. each means a loss of £2 10s. Twelve fowls out of the 20 laying each day would produce 36 dozen eggs, and valuing the eggs at 1s. 3d. a dozen throughout the year gives £22 16s. 3d. This amount, added to £2 10s., means a yearly loss of £25 6s. 3d., because the fowls are not given proper housing accommodation. Three hundred hens is not too large a number for any farmer to have for a side line. The selecting of the fowls should be given careful consideration. I favor equal numbers of White Leghorns and Orpingtons, because it is a good plan to dispose of the birds when they have laid for three years. A heavy breed, such as Orpingtons, will then make up for the loss on the lighter breed. A small incubator can be procured for about £8, and the cost of rearing the chicks to six months old would be about 4s. per head, a cost of £60. A house of fair quality, measuring 45ft. x 18ft., could be erected for £40, and it should easily accommodate 300 fowls. The cost of feeding the fowls without their going outside of the house can be estimated at 2½d. per head per week, but where the farmer is able to grow the greater portion of the feed, the cost of feeding would be considerably reduced. Three hundred pullets would cost about £3 2s. 6d. per week, therefore they would cost approximately £168 per year to feed. Two-thirds of the fowls would be laying each day and producing 116½ dozen eggs per week, which at 1s. 3d. per dozen equals £7 6s. per week, and for 52 weeks £379 12s. The initial outlay was £108, the cost of feeding them for the productive 12 months £168. These two amounts equal £276, and the fowls show a return of £379 12s., a profit of £103 12s. after an outlay of £108. This is a handsome profit, and one can easily allow, say, £3 12s. for a few birds dying through incurable diseases. The ensuing year the fowls would show a profit of £211, which is very profitable. The main points in the successful keeping of the birds are regular feeding and the keeping clean of the house. Tick can easily be kept out of the houses by painting the roosts and any crevices that are likely to harbor vermin with kerosene. The application of intelligence, good management, and energy will prove fowl-keeping to be a most profitable side line. In the discussion that followed, Mr. E. C. Atkinson said if poultry were to be managed as a profitable side line, it was necessary to give them a good deal of attention, and if any great number of birds were kept, it would take one man all his time to look after them. He thought that by letting the fowls have the run of the farm they would find half their food, and thereby save considerable time and labor. Mr. T. G. Cliff was not in favor of rearing the cockerels, because it would cost about 4s. to rear each bird, for which the farmer was only able to obtain about 2s. 6d. He did not think a farmer could feed the birds more cheaply than anyone else. Mr. E. H. Martin said if poultry were to be kept as a side line it was necessary to have the best breeds, to give them plenty of food and water, and not to confine them in a small space. Mr. A. B. Ferguson had never found the fowls a nuisance when they were allowed to run at large. He favored the hen for hatching, and thought the heavy breeds the most profitable for the farm. Mr. John Atkinson did not think it would pay the farmer to spend too much time with fowls. He did not favor the housing of poultry because it tended to increase the tick pest. Mr. T. H. Polgreen said if poultry were to be kept profitably they required a lot of attention, but he thought the housing of the birds was necessary on account of foxes.

PASKEVILLE, October 23rd.—Mr. R. A. Train read an article, "Mixed Farming on Small Holdings,' and an interesting discussion followed.

WESTERN DISTRICT.

CUNGENA.

September 19th.—Present: 19 members and three visitors.

LAYING OUT THE FARM.—Mr. J. A. McInnes, who read a paper dealing with this subject, first emphasised the necessity for selecting a suitable place for the homestead, which should be as near the centre of the block as possible and on

rising ground. He suggested that the temporary house should be made on the site, because it would be useful for storage purposes when the permanent home was built at a later date. He then referred to the paddocks, and advised fencing the block in two large paddocks, taking care to make a good job of the boundary fences. If time was limited, he advocated at the start putting in half the number of required posts, and later on the fence could be completed. He was of the opinion that barb wire was a necessity on all farms, excepting in those cases where one was able to erect sheep-proof or netting fences. The barb wire, if put on the fence about 2ft. 9in. from the ground, would alone hold most stock, but for sheep-proofing or netting, it should be put on top of the posts. He advocated a uniform style of fence throughout the farm, care being taken to select good timber for the posts. When cutting posts or timber for any job, the trees should be cut close to the ground, so that no further cutting would be needed when the land was cleared. He next referred to brush sheds, and advised

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the use of good timber for the uprights. The roof should be given a good slope by keeping the centre fork not less than 2ft. 6in. higher than the outside forks. The writer advocated wide gates, so that a team of eight or 10 horses abreast could be driven through, and thereby save time in moving large implements from one paddock to another. Struts were the main support of a fence, and corner and gate posts required very solid stays, which should be put well into the ground and bedded against a good block of stone. In the discussion which followed, Mr. Quinn said he favored placing the strut about half-way down the post. Mr. A. H. Hollamby did not favor strutting, but believed in putting the corner posts well down into the ground with a slight outward lean, so that when the fence was trained the strut would be pulled into a perpendicular position. Mr. O. H. Gerswortz did not favor strutting. Mr. R. L. Robertson advocated selecting a site for the homestead as near the centre of the block as possible, but the situation of the water supply should always be the determining factor. He also advocated making the fences a uniform size throughout the farm:—Posts 17ft. apart, 3ft. 4in. high, ordinary posts to be sunk 20in. into the ground, and strainers and corner posts 3ft. 6in. to 4ft.; barb wire on the top of the fence, and the first plain wire 10in. below for ordinary stock fences.

DAM SINKING.—Mr. H. C. Chappell, who read a paper dealing with this subject, said the position for the dam should be one that was recognised as the best catchment on the property, and the selected site should consist of land that could be ploughed satisfactorily. To determine these factors it was necessary to sink a few trial holes. After making the desired measurements, a peg should be driven well into the ground at each corner and cut off level with the surface. The best plan to adopt for the first two floors was to work the plough from corner to corner in order to enable the dirt to be scooped into the corner of the bank. If that were not done, trouble would be experienced in keeping the bank level. Prior to taking off the first floor it was necessary to plough around the whole of the dam to prevent digging into the edge of the dam when the plough was being worked. After the first floor had been removed it was necessary to measure 3ft. in from the corner pegs and carry on from where a start had been made on the previous floor. If that were done it would be found that when the work was finished, the dam would have a slope which would be quite convenient for all stock. It was always advisable first to sink a catch-hole, and when the main dam was completed a trench and earthenware pipes could be used to connect the dam and the catch-hole. Galvanized troughing running from the pipes in the dam to the bottom of same would also be required to prevent the flow of water washing away the batter. A few rails should be placed around each end to prevent stock damaging the pipes and troughing. In some cases the dam would not hold the water at first, and when that happened, as many stock as possible should be put into the dam when it contained a small quantity of water, in order to puddle the floor. Care should be taken when ploughing not to cut too deeply near the edge of the batter. To prevent such an occurrence, he suggested that the cut on the plough should be altered to a depth of about 4in. nearest the batter, and the next furrow could be made 8in.; from then onwards the plough could be let in to its full depth, to prevent the ridging of the batter.

DARKE'S PEAK.

September 19th.—Present: eight members and five visitors.

THE FARM GARDEN.—The following paper was read by Mr. Geo. Noble:—"The site selected for the garden should be close to the homestead in order to save labor and time. It should also be situated on a low-lying position, so that all drainage from the stables can be directed into the plot. When the rain falls the garden should be flooded in order to provide the trees with a good supply of subsoil moisture which is indispensible to the successful culture of fruit-trees. Melons, French beans, cucumbers, tomatoes, &c., can easily be grown by giving proper attention to the soil. If the soil is not especially suitable for a garden, the water drained from the stables will make a very good substitute for summer irrigation. To make the garden secure against fowls, &c., it should be

enclosed with a 6ft. wire-netting fence. Give the land a deep ploughing, then apply a dray load of stable manure to every five square yards of soil, and then plough in the manure, which will make a good foundation on which to build the garden."

TOMATO CULTURE.—At a further meeting held on October 3rd Mr. Noble read the following paper dealing with the above subject:—"Take a square rod of soil and dig it early in the autumn before the rains, and apply one ton of well-rotted stable or pig manure. When the autumn or winter rains come divert as much water as possible on to the plot and mix the manure into the soil to a depth of 12in. to 15in. I have grown plants up to March without irrigation by following the above method. I recommend Large Red Dwarf tomatoes as the best variety. Take a box 15in. x 12in. x 6in. deep and into it place 3in. of rich soil. Sow the seed thickly and press it into the soil with the aid of a board. Sieve well-rotted manure over the top of the soil, again compact the seed bed with the board, and keep it well watered. Next tip a load of fresh stable manure against a wall so that it will receive the direct rays of the sun, and place the seed-box down to the level of the top of the manure. Cover the top of the box with a piece of glass and keep the soil wet. The plants should show up three days after sowing. I advise sowing the seeds about the 1st of May. When the plants are up, say nine days, they should be about 1in. high, and the box can be taken out of the manure and placed where it will receive plenty of sunlight, care being taken to protect the seedlings from cold winds. The glass can be removed on sunny days, but it should always be replaced at night, or during cold windy weather. Thin out the plants to the number required and keep them well watered. Set out the plants about the beginning of September in rows 3ft. 6in. apart, with the plants 2ft. apart in the rows. Next, secure stakes 4ft. long and 1in. thick and place one close to each plant, driving it firmly into the ground. This job should be done early in September, or just after planting out the tomatoes. Cover the plants on the south and west sides with tins that have been cut in halves, and see that a hole for the stake is made in the top of the tin to keep it in position. The tins create artificial heat which forces the growth of the tomatoes, and wards off the cold winds and frosts. Keep the tins in place until the plants are about 1ft. high. If fine and warm weather is experienced, the tins can be removed. Give each plant about one pint of water when it is planted out, and after three or four days break the surface soil around the plants with a hoe or fork. By keeping the surface soil cultivated to a depth of 2in., the moisture will be conserved, and it will also destroy surface roots and tend to send the roots down deeply into the prepared soil. Cultivate the plot three times a week and good results will be obtained. A small grub about 1in. in length sometimes attacks the young plants, but by keeping the soil stirred up around the plants, the grubs will not do very much damage. Later on cut worms may also put in an appearance, but by irrigating around the plants the insects will be kept under control. Tie the plant to the stake after it reaches a height of 1ft. As the leaves sprout out from the stem, a lateral and also fruit flowers will be noticed, between the stem and leaf. Suppress the laterals by taking them out close to the stem with a knife or the finger-nails, care being taken not to injure the leaves or fruit flowers. Allow one stem to run up and tie it to the stake. Keep all laterals suppressed and tie a piece of twine under each bunch of fruit as it appears, care being taken to see that the stem is not cut by the string. Two stems can be made on a plant if it is making vigorous growth. If early fruit is desired, allow five or six bunches of fruit to set and then nip out the top of the stem. This will make the tomatoes develop more quickly. If the upper leaves curl, it is an indication that the plants are in need of water. Do not forget to cultivate the soil around the plants two or three times a week. If this practice is carried out the plants will not require water until March. Liquid manure has a tendency to bring the roots to the surface, which results in the burning of the feeders by the sun. If the plant has to be watered give the ground a good soaking and follow with a thorough cultivation."

KOPPIO (Average annual rainfall, 22.40in.).

September 25th.—Present: 10 members.

THE CARE OF THE FLOCK.—The following paper was read by Mr. M. Gardner:—"To farm successfully it is necessary to keep sheep. Before sheep can be kept the question of feeding has to be considered and the quantity of feed

and water that is available will determine the number of sheep that can be kept. It is a good plan to bear in mind that it is better to understock than overstock. One of the most essential factors in the successful handling of the flock is that the farm must be well and securely fenced. I have come to the conclusion, after considerable experience, that it is impossible to keep sheep satisfactorily unless the paddocks are very securely fenced. It takes very little more feed to keep a good sheep than to keep a poor one and the results at shearing time will tell which is the better proposition. I favor mating the ewes with the rams in November, and always endeavor to have a paddock of good feed and shelter saved for them into which they can be placed during March. The ewes should then be in good strong condition for lambing, for if the ewes are strong there is not much danger of foxes taking the lambs. I have watched the practice of hand-feeding lambing ewes, but in my opinion it is not very successful, because the ewes, being hungry, leave the lambs to come for feed. If feed is scarce, the better plan is to let the dry sheep go short in favor of lambing ewes and hand-feed the dry sheep. About a month before the ewes begin to lamb they should be yarded and crutched. To handle sheep profitably, it is necessary to have a dog that will help in the driving, mustering, and yarding. A good dog is a valuable asset and often saves time and labor. It is also necessary to have drafting yards and a receiving yard. The receiving yard should be large enough to hold the whole of the flock. In order to gauge the size of the yard, the farmer should allow two sheep to the square yard of surface, and it is always a good plan to allow a little extra space when building the yards. The small drafting yards can be used as catching pens for crutching, &c. Not only the ewes but all the sheep should be crutched before the commencement of the wet weather, because the wool can then be saved and a good price obtained at next shearing time. When the crutching is being done the wool should be removed from around the eyes of any sheep if it interferes with their sight. It is also a good plan to trim the feet of any sheep whose hoofs are making an abnormal growth. An ordinary pair of sharp carpenter's pincers does this very well. One often notices dirty and neglected sheep in the flocks and this, besides being wasteful, is cruelty to dumb animals and a source of danger in attracting blowflies. Some seasons grass-seeds are very bad, and when such is the case it is very necessary to pay particular attention to weaners, because it is often necessary to trim around their mouths, eyes, throats, and legs. This work should be done before the seeds work into the flesh. An advantage in having early lambs is that the lamb cuts a few pounds of wool, is ready to wean and make a start to do for itself while the feed is green, and the ewe has a chance to put on condition before the feed gets dry. After shearing a very important item in the care of the flock takes place—dipping. This should be well and carefully done by men who have the care and consideration of the sheep at heart. Too often sheep are rather roughly handled when being dipped. Dipping makes a considerable difference to the sheep, and the work should be done thoroughly. Tick-infested sheep cannot thrive and produce wool equal in quality to those free from tick, hence the value of dipping. Sheep are and have been a very paying proposition for years past, and it is false economy on the part of owners and breeders not to keep the best and look after them. Time spent on the care of the flock means extra profits in wool returns.

MILTALIE (Average annual rainfall, 14.55in.).

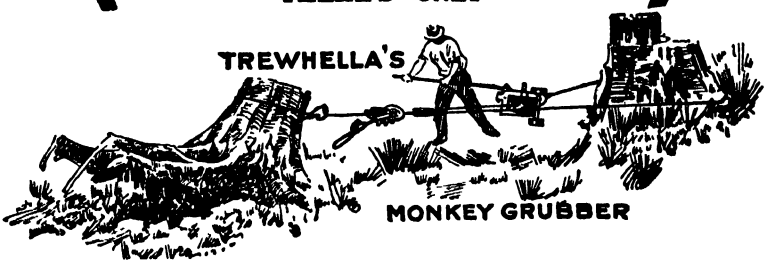
October 20th.—Present: six members and visitors.

KEEPING RECORDS OF THE WORKING OF THE FARM.—Mr. A. M. Wilsen read the following paper:—"Every farmer who is alive to his own interests should keep records of his holding, and it is an excellent idea to have a plan of the farm drawn up and each paddock and fence defined thereon. The condition of each paddock when fallowed and cropped last, the yield of the crop, the variety of wheat sown, whether improvement can be made in the methods of cultivation and particulars of mistakes that might have been made, should all be recorded. Such a record will enable the farmer to profit by experience. A lesson may be forgotten and a mistake of previous years committed again, but if these have been noted, it should be impossible to make the same mistake again. A farmer should also keep a record of all the livestock; the number of horses bought and

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sold during the year, how many mares foaled, any losses of livestock, and the name of the stallion serving the mares. The same plan could be followed out with cattle and sheep, especially regarding the sales and prices obtained. A record of the breed of ram and the time of mating with the ewes will enable the farmer to guard against inbreeding. By the farmer interested in fruit-growing and gardening, a record should be kept showing the dates of plantings and the results from the trees. Such a book would make an excellent history of the farm and would save a good deal of trouble when the annual statistics are required. In the records of the farm I think it is advisable to make a note of the date of the purchase of any implement, the price paid, and the length of its working life, how many tons of hay were cut, and the number of bags of wheat and oats grown annually. If during the year any permanent improvements, such as sheds, tanks, fences, &c., have been made, it is well to place them on record. The farmer should also keep a record of all income and expenditure during the year. There are such items as sheepskins, horsehair, &c., which are sold in small quantities, and very often no record is kept of these and other by-products of the farm. Such a book of records and facts would help a farmer in ascertaining his correct financial position, and would also assist him in no small measure to work his holding successfully.

MOUNT HOPE.

October 20th.—Present: 10 members and one visitor.

HINTS ON SHEEP DIPPING.—Mr. D. Speed contributed a paper on this subject. In mixing powder dips, he said, time and care would be amply repaid. The best method was to mix the powder in kerosene tins or drums. The packet of dip should be beaten smartly before the paper wrap was broken. One packet of dip should be emptied into each tin or drum. A small quantity of water should then be poured on to the dip and the mixture thoroughly stirred, more water being added gradually until the mixture was of the consistency of thick cream. Rain water should be used if obtainable. The best results would be obtained if the preliminary mixing were done two or three days before the dip was required, because the mixture was then in a soft, creamy state and blended readily with the water in the bath. The mixture should be stirred occasionally, and the quantity of water in the bath should be measured with a measuring stick and the side of the bath permanently marked with the level of each hundred gallons of water. On the morning of dipping more water should be added gradually to the creamy mixture in the tins until they were three-parts full, the mixture being stirred vigorously. The contents of the tins should then be poured into the bath through a strainer to prevent any undissolved lumps entering the bath. The bath should then be stirred thoroughly. If a number of sheep were to be dipped it would necessitate replenishing the bath. The sheep should not be hurried through the dip, neither should they be driven whilst wet, but should be given plenty of time to drain, and left under shady cover until dry. During the discussion which followed Mr. H. F. Myers emphasised the fact that the sheep should not be hurried through the dip. Several members thought that the best results were obtained when the sheep were dipped straight off the shears. Mr. W. Mahoney tabled some fine samples of turnips, swedes, and radishes. The average weight of the swedes was about 3lbs., and the turnips were almost as large. The samples were perfectly sound, and the members congratulated Mr. Mahoney on his fine exhibit.

PYGERY.

August 28th.—Present: eight members.

SEED WHEAT.—In the course of a short paper dealing with this subject, Mr. D. M. Smith made reference to the far-reaching effects that the work performed by the late Mr. W. Farrer had had on the wheat-growing industry of Australia. The speaker then gave an account of the method adopted in Canada to secure the improvement of seed wheat under farm conditions. The persistent use of the grader, Mr. Smith believed, would increase the grain yield of the State by 15 per cent. A keen discussion followed.

How to Keep the Boy on the Farm.—At a meeting held on September 23rd Mr. R. Woodrup read the following paper:—"In dealing with this subject I make no pretence at dealing with the matter of parental control, but merely desire to offer a few suggestions as to how the boys of to-day can be encouraged to remain on the land. Of late years there has been a considerable drift of the rural population towards the city, which can possibly be accounted for because of the remunerative positions and attractions that the city has to offer. When we think of this as compared with the every-day sameness of country life, and the fluctuating returns of the farmer of good and bad seasons, there is no wonder at the longing of the boys to be a part and parcel of this brighter and more attractive city life. This desire comes to the boy when he reaches that age and stage of life when he thinks he is a man and his father thinks he is a boy. This, I consider, is the critical stage, when the efforts of the father are required to offer good counsel and encouragement, and to show by practical means to the boy, that by remaining on the farm there is something more in sight for him than just hard work, no pleasure, and less pocket-money. I do not think a boy should be made to stick to farming as an occupation if he has his mind set on some other trade or occupation, because it is probable he will not make a successful farmer if this is the case It should be the aim of parents to allow their boys plenty of recreation, and to encourage them to take part in outdoor games and the social functions of the district. The boys should be taught to take an interest in the work of the farm, and also in the stock. This could be done by giving them the crop yielded from a piece of ground from which they have picked the sticks, or by giving them so many sheep or a calf. Care should be taken that these promises are kept or the boys will naturally become disheartened and discontented. As they become interested in agriculture they should be allowed to travel frequently and to visit agricultural shows in the city or other country centres and they will thus become acquainted with modern ideas in agriculture. Further, the boys' home life should be made as attractive as possible, and some musical instrument should be provided."

WOOKATA.

September 22nd.—Present: 12 members and two visitors.

Farm Tractors.—Several papers on this subject, taken from the *Journal of Agriculture* were read by Mr. Hobbs and Mr A. Oats. A good discussion followed. Several members expressed the opinion that the tractor would have to prove its suitability for rolling down scrub before it became popular in this district. Other members thought it would be necessary for the tractor to be so devised that in the event of the plough getting hooked fast in a large stump the power would be automatically released to prevent serious damage. No one doubted that the tractor would be economical for ordinary farm work so far as fuel and lubrication only were considered, but the item of depreciation was expected to be a serious one.

WOOKATA.

October 20th.—Present: 14 members and three visitors.

Haymaking.—The Chairman (Mr. F. M. Underwood) read the following paper:—"Portions of South Australia are subject to periods of drought, and a good stack of hay on the farm is absolutely essential. It is advisable to have sufficient hay to carry over at least two years. By cutting a little more in the green seasons, when it is not difficult to get a good cut of hay, the surplus will tide over the period when sufficient hay cannot be obtained. Every farm should have at least 50 tons of hay always on hand. On a new block the farmer should have two paddocks of 50 acres each for the purpose of growing hay; one could be fallowed whilst the other was growing a crop. If 100 acres of scrub land could be cleared and all the stumps rooted out, a farmer in this district would be sure of a fair cut of hay in any season. It is an established fact that the scrub land grows better and heavier crops than plain land, and this means more hay with less work. Early varieties of wheat or oats should be sown for hay, so that hay can be cut and stacked before the commencement of reaping. Smart's Early is the only wheat I have had experience with for hay, and it has proved satisfactory. I have not cut oats, but prefer oaten hay to wheaten, for feeding

to horses. The periods for cutting hay vary according to how it is to be used. If it is to be chaffed, I would leave the cutting until the grain is well formed. If it is to be fed to stock as long hay, then I would cut it, say, at least a fortnight after it has flowered. There is a good deal of waste in feeding long hay to stock, and I prefer to use chaff. When the hay is cut it should be stooked immediately behind the binder. The stooks should each contain about 40 sheaves, care being taken to stand the sheaves in an upright position. If a little care is taken with the stooking, it greatly reduces the danger of damage by wind or rain. Sufficient attention is not paid to this part of the business, and one frequently sees the stooks blown about by the wind, thus leaving them exposed to the rain. If the operator of the binder drops the sheaves in straight rows, the stooker can put the stooks in the same manner, and thereby facilitate carting. The hay should not be carted until it is thoroughly dry. This can be tested by examining a centre sheaf of a stook. Take a handful of hay from the middle of the sheaf and screw it up, and if it is dry it will be brittle and snap and break. If the weather is dry and warm, nine days is generally long enough to leave the sheaves in the stooks before stacking." In the course of the discussion that followed, some members agreed with the writer that enough hay should be on hand to carry the farmer over a period of drought, but they were of the opinion that mice did a lot of damage to hay when it was kept for any length of time, unless the farmer was in a position to erect mouse-proof yards. Mr. H. V. Hobbs agreed that Smart's Early was a good hay wheat, but he preferred Sultan and Caliph, and especially the former, which was a solid straw variety. He was in favor of Ruakura oats for hay, but was growing Early Burt oats for the first time, hoping they would prove a more suitable oat for hay. He favored round stooks, and thought the hay should be left in the paddock for at least a fortnight before being carted. Mr. R. Giles found horses did better when fed on wheaten hay than when fed on oaten hay. Regarding the point as to the correct stage at which to cut the crop, members differed in their opinions, but thought wheaten hay was not so likely to be damaged by mice, and to get the best results it should be cut when the grain was in the milky stage.

YADNARIE (Average annual rainfall, 14.09in.).

September 29th.—Present: 13 members and visitors.

HARVESTING WHEAT FOR HAY.—The following paper was contributed by Mr. W. L. Brown:—"There is scarcely any commodity put upon the market which varies so much in quality and appearance as hay. In many districts very little care is given to this product, and it is regarded only as a convenient method of getting something for that which is worth very little. Chaff production is rather different from other classes of farm enterprise, for chaff is not always the result of a crop grown intentionally for the purpose. Producers of chaff may be divided into two classes; those who grow for the purpose, and those who grow grain, but who, owing to frosting, weather, or other causes, have to cut the crop for hay and convert it into chaff. The best hay wheats, in my opinion, are those which yield straw and flag, of good color and body. The crop is at its best stage for hay a few days after it is in flower, for at this stage the plant contains its maximum amount of nutritive qualities, and at the same time the nutriment is evenly distributed throughout the whole plant. This is as it should be, for when preserved as hay the whole of the plant has to be eaten, and not only the ears. Though the crop at this stage contains the maximum nutritive qualities, it has not reached the stage when it will produce the greatest weight of hay. The dry matter in the plant increases until it is mature, and because of this, some farmers do not cut until well past the flowering stage in order to get a greater quantity of hay; the extra weight is gained at the expense of feeding value and color. In both matters of variety and of time of cutting the grain-grower is at a disadvantage, more especially when he delays cutting as long as possible in the hope that he will get a crop of grain. In this case the only advice that can be offered is, cut at the earliest possible moment that you are satisfied the grain yield will not be profitable. To cut at the right time to secure the best food value it is essential that it be dried, and so preserved with as little loss as possible of food value. Two causes of loss are the result of rain washing out the sugar and other soluble ingredients, and the heat of the sun bleaching the hay. The sheaves should be stooked as soon as possible after the binder. The sheaves in long open

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stooks dry more rapidly than those in round ones, because more sheaves are exposed to the sun. Long open stooks are suited for moist districts, and large round ones for dry districts. Sheaves remain in the stooks until the hay is so dry that when it is placed in the stack it will not heat or mould. This stage is determined by drawing a handful of straws from the middle of the stook and examining the nodes or joints in the straw. If these are dry the hay can be safely stacked. This period is usually reached between 14 and 18 days. It requires watching, however, as the stage at which it is carted in will influence its quality. If the upper joints have shrunk it may be taken that the hay is dry enough to stack. If taken in before this takes place, it is apt to sweat, if left too long after this stage has been reached it will so harden as to make it difficult to turn out good chaff." In the discussion that followed Mr. G. B. Kobelt said in new mallee districts farmers had to grow oats to prevent take-all and consequently in many instances oats were cut for hay instead of wheat. He favored large round stooks. Mr. F. W. Jericho said large stooks would not blow over so easily as small ones. Mr. W. O. Kruger also agreed with the writer's remarks, and said wheat and oats sown together made excellent hay. He believed in cutting oats on the ripe side and spoke in favor of big stooks containing about 90 sheaves. The Chairman (Mr. A. Spriggs) favored cutting wheat for hay on the green side and oats on the ripe side. Oats could some years be cut fairly green if the stems had turned a blood-red color. He varied the size of the stooks according to the length of the hay.

BUTLER, November 4th.—Several matters of local importance were brought before the meeting for consideration, and interesting discussions ensued.

CARROW, September 26th.—The report of the delegates to the Annual Congress was received, and members discussed the question, "Tillage of the Soil and General Farming Practices."

CARROW, October 24th.—Mr. M. Bawden read an extract from the *Journal of* Agriculture, "Farm Management and Efficiency," and an interesting discussion followed.

COLLIE, October 9th.—Mr. C. A. Goddard (Assistant Wool Instructor at the School of Mines) attended the meeting and delivered an address, "Care of Sheep and Wool."

A further meeting was held on October 27th, when several subjects of local interest were brought forward for discussion.

GOODE, August 29th.—Mr. L. Will gave an address in which he dealt with the subject "The Objects and Value of the Agricultural Bureau."

A further meeting was held on September 26th, when the subject, "Eradication of Charlock," was brought before the meeting. Mr. S. Will was of the opinion that a flock of sheep allowed to graze on the plants when they were bursting into seed would keep the weeds under control. Messrs. P. Linke and P. Hunt said cattle also ate charlock readily. Mr. C. Will said that the weeds could be destroyed if the land was cultivated when the plants were small.

LAKE WANGARY, October 12th.—Mr. C. A. Goddard (Assistant Wool Instructor of the School of Mines) attended the meeting and delivered an address, "Handling the Farmer's Clip." A practical demonstration of wool-classing was also given by Mr. Goddard.

At a further meeting held on October 27th, extracts from the Departmental Bulletin, "Tillage of the Soil," were read by Mr. P. Houston, and a good discussion ensued.

LIPSON, September 22nd.—"Farm Management" was the subject of a paper read by Mr. W. Brown, which provoked a keen and interesting discussion.

MALTEE, October 16th.—Fourteen members attended the October meeting of the above Branch, when several subjects of local interest were brought forward, and an interesting discussion followed.

ROBERTS AND VERRAN, October 18th.—Mr. M. Masters read a paper, "The Advantages of the Agricultural Bureau." The subject, "Registration of Stallions and Bulls," was also discussed, and the delegates to the Annual Congress and Minnipa Conference gave an interesting report of the proceedings of both gatherings.

EASTERN DISTRICT.

NETHERTON.

October 19th.—Present: 14 members and four visitors.

WHEAT-GROWING.—In the course of a paper under the heading of "Is Wheat-growing Profitable at the Present Price for Wheat?" Mr. McLean suggested growing oats, barley, and peas instead of wheat, and expressed the opinion that lamb-raising and wool-growing would be more profitable especially if the destruction of foxes were enforced. He suggested that a bounty should be paid for foxes' scalps, as was done for wild dogs. If Australian wheat were graded under the same system as was practised in Canada, he thought that would make a great deal of difference to the price.

GERANIUM, September 22nd.—The meeting took the form of a debate on the subject "The Tractor v. the Horse." Mr W. J. Mitchell supported the case of the tractor, whilst that of the horse was argued by Mr. W. Pannell, and a lively discussion followed.

GLOSSOP, October 3rd.—Mr. G. J. Jackson gave an account of the Winter School for Farmers that had been held at Roseworthy Agricultural College, and read a paper dealing with "Ailments of Livestock," from notes that had been compiled from lectures given at Roseworthy Agricultural College and standard veterinary publications. Mr. Ellis read the annual report, and the officers were elected for the ensuing year.

MARAMA, October 22nd.—The paper, "Tillage of the Soil," which was contributed by Mr. W. J. Spafford, Superintendent of Experimental Work, at the Annual Congress, was read by the Hon. Secretary (Mr. T. C. Hinkley), and a good discussion followed.

MOOROOK, October 26th.—The Assistant Government Veterinary Surgeon (Mr. F. Murray Jones, B.V.Sc., M.R.C.V.S.) attended the meeting and delivered an address, "Common Ailments of Horses," to a gathering of 19 members and five visitors.

MURRAY BRIDGE, September 7th.—The Vice-Chairman of the Advisory Board of Agriculture (Captain S. A. White, C.M.B.O.U.) delivered an address, "Across Australia by Motor Car," to an audience of 40 members and visitors.

On September 29th a large number of members of the Murray Bridge, Clarendon, Mount Barker, Strathalbyn, and Mypolonga Branches of the Agricultural Bureau inspected the S.A. Farmers' Co-operative Union milk factory at Murray Bridge, and took part in a river excursion to Wood's Point.

MYPOLONGA, October 22nd.—Mr. N. Forester (Recorder of the River Murray Herd Testing Association) attended the meeting and delivered an address, "The Advantages of Herd Testing."

PARUNA, October 12th.—A discussion took place on the use of sheep in preference to working the land with implements in order to keep rubbish down on the fallow. Mr. C. G. Petch considered that in a year such as the one through which they were passing it would not be possible to keep fallow clean without the aid of sheep. Mr. Groom contended that it would be more profitable to employ an extra team rather than rely on sheep. Messrs. Bowman and Reichstein were of the opinion that only by the judicious use of sheep, the cultivator and harrow, could satisfactory fallowing conditions be obtained.

SOUTH AND HILLS DISTRICT.

CHERRY GARDENS (Average annual rainfall, 35.03in.).

October 23rd.—Present: 13 members.

ROTATION OF CROPS IN THE VEGETABLE GARDEN.—In the course of a paper dealing with this subject, Mr. H. Strange said it was not advisable to sow root crops such as carrots, parsnips, &c., too frequently on the same piece of land.

Those crops should not be sown more than once in three years. If crops were sown too frequently the plants appeared to be very susceptible to such diseases as yellow leaf and mildew and, when once these appeared in the garden, they were difficult to eradicate. The same plan should also be followed out with turnips and swedes, the first-mentioned being very subject to "die down," a disease dreaded by the growers in the hills. If turnips or swedes were grown on the same land for more than one year, it was necessary that when one crop was taken off the land should be ploughed and left to the sweetening effects of the sun, but even in that case there was a good deal of danger attached to the growing of turnips and swedes for more than two years in succession. Lettuce was not a profitable vegetable in the hills, but the crop could be grown if it was planted on land that had previously carried potatoes. Mr. Strange said it was possible to grow profitable crops of cabbages and cauliflowers on dry land every year, provided the land was fallowed during summer; but the better plan was to plant cabbages and cauliflowers after a crop of peas or potatoes at intervals of two years. Personally, he thought no attempt should be made to grow the cruciferous plants more frequently than two years in succession, because they were subject to the diseases known as clubfoot and mildew. Potatoes and tomatoes belonged to the same family of plant life, and on no account should they follow one another. They would yield better crops if they were not sown more than two years in succession on the same piece of land. He had found that by planting garden peas and French beans after the land had carried either tomatoes, potatoes, cabbages, or cauliflowers, a much better return was secured than if they were planted two years following on the one block of soil. The speaker stated that he had given up trying to grow onions because of the ravages of the disease "die back," but he thought that by a careful selection of the seedlings successful crops could be raised in favored localities. Potatoes he had found yielded very satisfactory returns when sown on land that had carried peas, beans, cabbages, or cauliflowers the previous season.

The Branch decided to place on record the valuable work that had been performed in the interests of the Cherry Gardens Branch of the Agricultural Bureau by the late Mr. Thos. Jacobs.

HARTLEY (Average annual rainfall, 15in. to 16in.).
September 21st.—Present: 17 members.

The sixteenth annual Homestead Meeting in connection with the Hartley Branch of the Agricultural Bureau was held at the residence of Mr. J. M. Hudd, Bletchley, on September 21st, 1923. During the afternoon a demonstration of the Fiat 20-30 h.p. tractor pulling an eight-furrow plough, pulling logs and trees, and driving a circular saw and a milking machine, was given. Keen interest was also displayed in a milking machine that had recently been installed. In the evening 84 guests sat down to a dinner which was provided by the host and hostess (Mr. and Mrs. J. M. Hudd), over which Mr. D. F. Westwood presided. The following toasts were honored:—"The King," by the chairman, Mr. D. F. Westwood; "The State," by Mr. P. Heggaton, M.P., responded to by Mr. H. S. Hudd, M.P.; "The Agricultural Bureau," by Hon. G. R. Laffer, M.P., responded to by Mr. J. Sanders; "The Visitors," by Mr. B. Wundersitz, responded to by Mr. F. E. Smith; "Adelaide Motors Limited," by Mr. D. F. Westwood, responded to by Mr. S. Crawford; "A. W. Sandford & Co.," by Mr. C. Hassam, responded to by Mr. S. Hattam; "Mrs. W. Brook, sen.," by Mr. J. Stanton; "The Host and Hostess," by Mr. E. J. F. Crawford, responded to by Mr. J. M. Hudd. The annual report was read by the Hon. Secretary (Mr. W. B. Hudd), and a short address, "The Tractor," was given by Mr. Edgerley. As a mark of appreciation of the interest displayed by the members of the family in the tractor trial, Miss Hudd was presented with a silver double entree dish. Games, &c., brought an interesting and enjoyable day to a close.

LONGWOOD (Average annual rainfall, 37in. to 38in.).
September 22nd.—Present: five members and six visitors.

HOMESTEAD MEETING.—The monthly meeting of the Branch was held at Mr. Gurr's residence when a very instructive afternoon was spent in inspecting the poultry plant and mixed farming practices of the Messrs. Gurr Brothers. A

paper, "Motor Transport," was read by Mr. J. C. Blakely, in which the speaker instanced the period when the motor vehicle was considered an expensive luxury. From that stage Mr. Blakely traced the history of the motor car, until the present day, when the motor car and the motor truck could almost be termed one of the prime necessities of the business and producing communities. An interesting discussion followed.

MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).

September 25th.—Present: 10 members and visitors.

CARE OF FARM HORSES.—The monthly meeting of the Branch was held at Mr. H. Brumby's residence, when Mr. W. Adams read a paper dealing with the care of farm horses. If horses were to receive proper attention, he said, there was only one person who should be held responsible for them, and that was the driver of the team. He should know the horses and be able to care, feed, and work them in the best manner possible. One of the first cares of the driver should be to see that the horses were properly fed and watered. The feed should be clean and of the best quality. For feeding horses, he thought the wooden manger the best because it was easily kept clean and dry. The horses could be turned out in the spring when feed was good, and they soon put on condition, and if given two or three feeds a day they would be able to stand a fair amount of work. Hay should not be chaffed too finely, so that the horses would have to chew it thoroughly whilst feeding. Plenty of good clean water close to the feeding-yard or stable should always be available. The water trough should not be in the stable yard because there always was the danger of it becoming polluted with dust and rubbish. The stable yard should be cleaned out as often as possible. The provision of a clean rolling-yard would prove beneficial to the horses. The

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team should be carefully groomed, special care being taken with the shoulders to remove all dirt and sweat. The collars should also be cleaned at regular intervals. The harness should fit each horse properly, and one set of harness should be set aside for each horse. The mane should always be removed from under the collar. The following points, the speaker thought, were worthy of the consideration of every teamster:—"Do not work the horses too hard and do not overtax their strength. See that the team works evenly and that each horse does its share of the work. Do not put a small horse alongside of a larger animal and expect it to do the same work; give the advantage to the smaller horse. It is a mistake to make the horses walk too quickly, because once a horse becomes leg weary, and especially a heavy horse, it takes a long time to recover its power. The driver should occasionally walk alongside of the team because he will then have a good idea of the pace the horses are travelling. Use the whip as little as possible. Do not work a team more than eight or nine hours a day, excepting perhaps during harvest time. When the team has finished working for a few days, do not turn the horses straight out into the paddock to look for their own food; give them at least one feed a day. Trim the tails of the horses, but do not bob them too closely, and keep the mane free from knots."

RAPID BAY.

October 13th.—Present: 26 members.

FARM BUILDINGS.—Mr. M. Jones contributed a paper on this subject. He said one of the many items to be considered was the economical construction of sheds. Stone and galvanized iron sheds were undoubtedly the best to erect for durability and satisfactory service. The question of the best, cheapest, and most reliable roofing had also to be considered. The galvanized iron roof appeal to everyone as being the most serviceable. On the other hand, it was expensive, although it was sometimes forgotten that the first cost was the last cost. A good job was often spoilt by erecting a straw or other cheap roof, which resulted in a leaky and ugly-looking structure. It was also a harbor for sparrows and other birds and needed a great deal of attention. The gable roof was the most costly, but had many advantages over the flat roof, one important factor being that in summer it was much cooler; it also had a much better appearance, and was not so likely to be blown off during strong gales. On the other hand a flat roof covered a greater amount of floor space, and timber was also saved, which was a large item in the construction of any building. In the southern districts it was advisable to have the open side of the building facing the south-east or east, because the greater portion of the rough weather came from the west and north-west. A good discussion followed the reading of the paper.

ROCKWOOD.

September 24th.—Present: 15 members.

DAIRYING.—The following paper was read by Mr. L. Tucker:—"The success of a dairying venture largely depends on whether the dairyman has a farm suitable for his occupation, because it is not all farms that are suitable for the purpose. The dry period of the year calls for artificial feeding, and I find that the herd demands the heaviest amount of feeding during April, May, June, and July. The longer the farm supports the herd without aid, the larger will be the profits. By support, I mean haystacks, bran, and oats, the purchase of which during the cold weather considerably reduces the profits. Nevertheless, there are many kinds of cereals that can be brought into use at this juncture. Dairy farmers frequently refer to the use of maize, mangolds, clovers, and lucerne. Of the above fodders, I have found lucerne to be the best. The care of the herd is another important part of the dairying business, because it is not every man that is suitable to manage a dairy herd. During milking the cow should be kept as calm and as normal as possible. The time of milking is very important. To get up at 6 o'clock in the morning during both summer and winter is something which does not appeal to many people, and the man that is loath to leave the blankets in the morning will not be able to give the proper care to his stock. I firmly believe in punctuality for working a dairy. Milking cows at 6 o'clock one morning, 7 the next morning, 5 at night, 6 another night, will not permit of the work being done to the best advantage. If the milking is done at, say, 6 o'clock

learn to come home at these hours. The actual milking of the cows is another important point which many dairy men do not seriously consider, and especially now that milking machines are in use. I strongly recommend stripping the cows, whether machine or hand milking is practised. When a cow comes in it is a mistake to milk her out quite dry. It is always advisable to leave some milk in the udder for five or six days, until inflammation and the danger of her catching cold in the udder is reduced. As a preventive, I suggest that a small quantity of kerosene and olive oil should be rubbed into the udder for the first day or two. If a cow has a "weak quarter," it is a very good plan to milk that quarter out for a fortnight before she comes in. Where a dairyman only has a small herd and does not market his cream, say more than twice a week, he should always run the cream from the morning and night milking into separate vessels, and mix the cream together when it is cold. When, however, the cream is sent away every day, I find that it is best to run the day's cream into one vessel, but the cream must be stirred at every opportunity in order to prevent it maturing too quickly. Always wash and scald all the utensils immediately after use." In the discussion that followed Mr. S. Collett said punctuality in the times of milking, both morning and evening, were essential. Mr. Curnuck stated that he had three acres of red clover on which 20 cows were kept continuously through the summer months. He had found the practice of milking out the weak quarter of a cow before calving a very good practice. Mr. E. R. Heath found mangolds a good fodder for cows. Mr. Dunn said punctuality was the key to success in dairying. It did not matter if the cows were milked at 4.30 a.m. and 2.30 p.m. if those hours were kept each day. He believed in feeding artificially, and considered a good cow would always pay for its feed. A cow would always respond to proper care and kindness. The Hon. Secretary (Mr. M. J. Meyer) was a strong believer in keeping regular hours for milking periods, and also in stripping out after milking. He was at the present time conducting a thorough test in feeding costs. The weight of crushed oats, bran and chaff was measured, the cost arrived at, and when those costs were placed against the cream returns it was found that in spite of the high price of foodstuffs a very substantial profit was gained, with butter at 1s. 5¾d. per lb.

ASHBOURNE, September 24th.—Mr. H. R. Meyer read a paper, "Sheep Farming," and supplemented his remarks with extracts from the paper read at Congress by Mr. R. C. Scott, "Fat Lamb Raising Experiments."

ASHBOURNE, October 23rd.—The Hon. Secretary (Mr. V. H. Cox) read a paper, "Beekeeping," and also a number of extracts taken from the *Bee Journal*. An interesting discussion followed.

BLACKWOOD, October 15th.—The Assistant Dairy Expert (Mr. H. J. Apps) attended the meeting and delivered an address in which he dealt with several phases of the dairying industry.

BLOCK E, September 10th.—Mr. S. T. Woodward attended a special meeting of the Branch and outlined his scheme for the reorganisation of the A.D.F.A., which was followed by a good discussion.

At a meeting of the Branch held on September 25th Mr. C. A. Ritchie contributed a paper entitled "How to Read the Barometer," and a long discussion ensued.

KANGARILLA, October 25th.—Seventeen members and 15 visitors attended the October meeting, when the Horticultural Instructor (Mr. Geo. Quinn) delivered an address, "Pests in the Orchard."

LONGWOOD October 20th.—The monthly meeting of the Branch was held at Mr. J. Roebuck's homestead. Accompanied by the host and his family, members spent a most enjoyable afternoon in inspecting the orchard and vegetable garden. Afternoon tea was provided by Mrs. Roebuck.

MOUNT BARKER, October 24th.—Addresses dealing with the subject, "Type of Pig Required by the Bacon Curing Trade," were given by Messrs. G. Jacobs and H. A. Monks to an attendance of 30 members and several visitors.

MOUNT PLEASANT, October 12th.—Mr. J. S. Miller read a paper, "Congress and the Show," in which he gave a comprehensive report of both gatherings. A keen discussion followed.

PORT ELLIOT, October 17th.—Mr. Wm. Green reported on the proceedings of the Annual Congress. The subjects, "Spraying Fruit Trees," "Sheep Dipping," and "Rabbit Destruction," were brought before the meeting, and a keen discussion followed.

SHOAL BAY, September 23rd.—Nine members and three visitors attended the September meeting when a paper, "How to Make the Best of Your Land," was read by Mr. A. Nash. The report of the delegates who attended the Annual Congress was also received and discussed.

SHOAL BAY, October 23rd.—Mr. O. B. Schafer read a paper, "Preparing Scrub Land for Agriculture." The writer recommended ploughing with the stump-jump plough in preference to the disc implement, and suggested a sowing of 1½bush. of Algerian oats with 100lbs. super in order to secure a good stubble burn. Members generally favored the disc plough because it was not so liable to hang on the stumps as the stump-jump plough.

SOUTH-EAST DISTRICT.

ALLANDALE EAST.

October 26th.—Present: 11 members and three visitors.

DAIRYING.—A lengthy paper under the heading "How to Make the Best of Your Land," was read by Mr. Davidson. The South-East from Penola to Allandale, and Glenburnie to Furner, had unlimited possibilities in the production of milk, pork, and mutton. The rainfall was sure, the climate congenial, the soil excellent—an ideal region for dairying. "Take a farm of, say, 60 acres of second quality land," he continued. "A man should be able to milk 20 cows, which, if fed fully, would return £350 a year; besides, he could make £30 on pigs, £20 in calf stock, making a total of £400. In addition, he would partly keep his house and live rent free. Many are doing better than this on smaller holdings by intense culture and well-regulated herds, with the farm wisely divided into suitable paddocks say, 40 acres for grazing and 20 acres devoted to hay and fodders, varieties to suit each season of the year. Ten acres for hay would leave 10 acres for plots of millet, Sudan grass, lucerne, maize, chou moellier, and the usual catch crops in autumn of barley, oats, vetches, and peas. A man and his wife, or a lad, can manage a herd of 20 cows, while with the aid of a milking machine one person can attend to all the milking, as the whole herd of 20 would never be all in milk at the same time. At least one-third of the herd should calve at the end of summer or early autumn. As soon as the natural grass dries off at the end of December the green fodders come into use. Either lucerne, millet, or Sudan grass will be ready to graze, and chou moellier can be hand-fed. With any crop that the cows can graze much labor is saved. Cows should not be allowed to graze such crops more than two to three hours a day. For the other part a liberal allowance of hay or chaff should be fed. This, with the green fodders makes a balanced ration. While I do not advocate excessive hand-feeding, yet at seasons it pays really well. Concentrates, such as crushed oats, bran, and linseed meal, fed in the colder months in conjunction with green food, add considerably to the cow's welfare, and keep up her condition and flow of milk. About 10lbs. of chaff a day and a few pounds of oats, linseed meal, or ground barley make an ideal ration. The superabundance of grass and rank growth of oats and barley, which often are half-wasted in the growing months, should be conserved either in a stack, pit, or above-ground silo. Splendid ensilage can be made by stacking the green stuff if a proper silo cannot be afforded. The

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THE AGRICULTURAL BUREAU.—Particulars of this Organization, of which every farmer should be a member, can be had on application to the Department.

cows eat it readily when the grass dries off, and respond at the bucket as if they had been turned into a paddock knee-deep in clover and grasses. Without proper and continuous feeding the herd will only produce one-half its full capacity. At least half the cows in the State, and for the matter of that, in the South-East, are half-starved for half the year. When a herd of cows, be they ever so few, is allowed to spell and loaf, and dry off for the lack of food after midsummer for five or six months in the year, the owner is simply courting disaster. He is ruining any milking abilities his cows may have. A normal cow should at least do duty for 10 months of the year. Every farmer should endeavor to arrange for a continuous flow of milk, by wisely mating the animals at the right period, so that the cow will have every opportunity of giving a payable quantity of milk in the year. It is an unprofitable and shortsighted policy to lose the use and value of a cow for many months in the year. Not only that, the milking habit is curtailed—the milk organs become in a way atrophied, because the mammary glands are not given a chance to develop. A cow habitually allowed to dry off after six months' lactation goes dry, or partially so, at the same time each year in sympathy with habit. That is why the period of milking in a heifer should be extended as long as possible to make her acquire the habit. All dairy farmers imbued with a desire to increase their incomes in the wisest way must study the individuality and needs of their cows as a first essential. A large number of cows have latent milking abilities that never get a chance to develop at the bucket, simply because they are for half the year under-nourished, under-fed, and often at starvation point when natural grasses dry off. It is a well-known fact that there are numerous cows in the South-East, and elsewhere, too, that produce only 250 gallons in their lactation period; but if the same animals were fed discriminately and continually to their full digestive capacity, many of them would reveal qualities and produce quantities that would surprise their owners."

KONGORONG.

October 22nd.—Present: 20 members.

RAISING AND FEEDING PIGS AS A SIDE LINE.—The following paper was read by Mr. W. G. Morrison, who had had experience in the raising of pigs in Canada:—"In spite of the reputation the pigs have for uncleanliness, they are really very clean animals, provided they have the opportunity, and there is almost no limit in the variety of food they will consume, but they always prefer wholesome food to more or less doubtful refuse. Clean, warm, healthy housing and wholesome food are essential for the best results. In the first place, there is no animal on the farm that will respond more quickly to good treatment and accommodation, and few will give quicker returns. With proper care and food a pig should weigh 200lb. live weight at six months old. I favor a Yorkshire or Tamworth sow. They both make first class mothers, and usually raise from 10 to 14 in each litter twice a year. This class of sow mated with a good Berkshire or Chester white boar will produce first rate pigs of the bacon type. They mature early and are easily fattened, and furnish the class of carcass the American packing houses demand for their export trade in bacon and hams. If the American packing houses demand this class of pig, the same must hold good in Australia, because the market of both countries is Europe; and, as is well known, both Canada and the United States of America have a very large export trade in cured meats. So far as I can find out, Australia seems to have neglected this line of export and concentrated on frozen mutton. To make a place for herself in the world's markets, Australia must produce what those markets demand, and not what we may want them to take from us. She must squeeze the other fellow out, and to do this we must produce at least as good or better articles. The young pigs should have an outlet from the brood pen to a separate trough, in which they can be fed with pollard and either skim milk or whey and also have the run of a plot of good green fodder, such as kale, rape, or oats a few inches high, as soon as they will eat for themselves. At eight weeks the litter can be weaned and brought along on chiefly green fodder, with a small allowance of pollard and whey. When about four months old a little dry crushed oats may be added to the feed. At five months they should be well developed, and will require comparatively little extra feeding to finish for the

market. The pigs that are to be fattened should then be placed in a fattening pen, where exercise will be more or less restricted. This pen should be the sleeping quarters, and it must be absolutely wind and weather proof, but well ventilated with a floor so that the bedding will be kept thoroughly dry. I prefer crushed barley for the fattening ration. Barley-fed pork is considered superior in flavor and texture to corn-fed. I always feed the barley dry. At all stages of the pigs' development they should have access to clean fresh water. It is comparatively easy to grow kale or rape for nine months of the year in this district, and with two or three small paddocks of these fodders the pigs can be changed from one to the other, especially if a movable shelter is provided that will shelter them from the hot sun or strong winds. Barley can be grown very easily, and will produce good yields on land that has grown a crop or two of wheat or oats. So far as I can find out, 20bush. of barley is by no means an uncommon yield in the South-East, and 10 acres would yield, at that rate, 200bush., which would finish a large number of pigs, and give a very profitable return per acre as well. On one occasion I kept an accurate account of the gain in weight and the amount of barley consumed in the fattening of eight hogs. When I sold the pigs, barley in Canada was worth 1s. 5½d. a bushel, and I sold the barley in the form of pork at 2s. a bushel. These figures are by no means extraordinary, but show that in many instances the grain can be made to pay better returns if fed to stock. As the local cheese factory is proposing to install a grain-crusher, the opportunity to feed crushed grains will be within the reach of all. Many people hold the opinion that if pig-raising were carried on more extensively here and throughout Australia, prices would drop below any chance of a profit. That is perhaps true in a sense, but, according to the press, there seems to be a decided movement towards developing a market abroad for Australian hams and bacons. So far, it has not been too successful, chiefly because we do not have the quantity to supply a fair demand when that demand is created, and also partly because Australian packers do not seem to put up quite the class of goods demanded abroad. The packing houses in Australia seem to cater to the local demand only and never give a thought to the foreign markets, and as a consequence are very independent in regard to the price they pay for the pigs and also the class of bacon they turn out. The American packers reached the position which they hold to-day by studying the class of goods demanded in Europe, and they have succeeded in competing successfully with Denmark, probably the largest bacon and ham exporter, per capita, in the world. To export cured meats in sufficient quantities to supply the demand, when that demand is established, requires large up-to-date establishments, involving the outlay of a considerable sum of money, yet I firmly believe that the day is not far distant when the small curing plants scattered all over the State will be done away with, and these will be concentrated in a few large up-to-date establishments in some of the largest seaports and cities. The fact that the pigs have to be travelled perhaps 600 or 700 miles to the ship is not an insurmountable difficulty, because a well-finished pig fed on dry barley chop will shrink very little in weight on such a journey, provided the animals are fed and watered after so many hours on the train. This is compulsory in the North American Continent. The American stock trains are not allowed to be shunted on to a side track and left standing beyond a certain time limit. There seems to be a prevalent idea that pigs cannot be shipped any considerable distance in Australia in warm weather, on account of the abnormal shrinkage in weight. Such trouble, I consider, lies chiefly in the method of handling and the accommodation provided for the stock during transit. Pigs are shipped every month of the year in Canada, and I have shipped fat pigs 700 miles in July—the warmest month in Canada—with very satisfactory results. If livestock were handled by the railways somewhat along the lines in force on the American Continent, it would be found that the shrinkage would practically adjust itself when Australia becomes a bacon and ham exporter, because the packing houses will demand that the animals shall arrive at the abattoirs in first class condition. I have more than once heard it mentioned that pigs, as a whole, are not so healthy in the South-East as they are in some other districts. Personally, I believe that 99 per cent. of the trouble lies in the unhealthy and neglected conditions of the pig yards, as well as the custom of throwing them almost any and every kind of refuse to be eaten; and if in the morning and 4.30 in the afternoon, it is surprising how the herd will

the pigs are not fairly well fed, and happen to be fed only enough to keep them alive, they will certainly eat almost anything, with the result of unhealthy and thriftless animals." Figures were then quoted by the speaker from the Department of Agriculture Bulletin 164, "The Pig Industry, a Neglected Source of National Wealth."

MILLICENT (Average annual rainfall, 29.25in.).

October 6th.—Present: 12 members.

SPRING FALLOWING.—Mr. F. Kay read the following paper:—"By spring fallowing I mean the practice of breaking up land in the spring, with the ultimate object of a grain crop to be sown in the following autumn. It must be admitted that this practice is lacking in our district, but it is very popular in other parts of the State. Bare spring fallow consists of ploughing the land fairly deeply as soon as the winter has settled sufficiently to enable the work to be done without clodding the soil, and to cultivate the soil during the summer according to the rains. To arrive at the monetary value of this practice, it will be necessary to experiment with two fields of similar soil, and keep an account of the results. The spring fallow field will have to be debited with the loss of grazing and whatever summer cultivation it may have received, then at harvest time it can be definitely said whether spring fallowing is a profitable undertaking. Much has been said of the loss of feed from land that is kept under bare fallow, but on the basis of a sheep-to-the-acre yielding £1 per acre net profit from each sheep, it would only need 4 to 5 bushels extra of wheat at harvest time to compensate for the loss of grass. In the case of a straight-out business of grain production, where half the farm each year is under crop and half under bare fallow during the summer months, the sheep-raising capacity is limited to the period of the stubbles—from after harvest until the stubble is ploughed in at fallowing time, say, in September. If three-course rotation, crop, fallow, and stubble is adopted, as is now commonly practised in the northern wheat areas, it will be found that the extra feed produced on the stubble, together with the green picking that will be had from the fallow, especially after summer rains, will enable an increase to be made to the number of sheep that can be carried on the property. In the north the practice of burning the stubbles is not carried out to any great extent, and it is a fact that there are more sheep reared now in the northern wheat areas than there were on the land in the days of the squatters. Northern practices are not always applicable to these parts, but we may learn much from our neighbor's experience, and I venture to say that much good would be derived from further experiments in these districts in the matter of spring fallowing." In the discussion that followed Mr. F. Williams said he thought that fallowing would not pay on the expensive land in the Millicent district. Mr. D. Hannaford said the stubble feed and green picking on the fallow would be equal to all grazing, in addition to the enhanced grain yield, that would be obtained. Fungus diseases and foreign weeds were never so noticeable on ground that had been spring fallowed. Mr. G. Major had left a strip of unploughed land in a fallowed paddock that had been sown with Yandilla King, and that strip was noticeably behind the other portion of the paddock. Mr. F. E. White said feed grew better on burnt stubble than on land that was not burnt. Messrs. F. T. Clifford, J. W. Williams, and H. J. Hutchesson agreed with the last speaker.

NARACOORTE (Average annual rainfall, 22.60in.).

September 8th.—Present: nine members.

POULTRY BREEDING AND FEEDING.—The following paper was read by Mr. F. A. Holmes:—"This is one of the most important subjects that can claim the attention of the poultry breeder, and is one which underlies all the principles of successful poultry breeding. The birds in the breeding pens should have all the characteristics of productiveness, and the most essential factors are type, constitution, vigor, and general character. Do not mate up every bird you have; select the best layers of last year, and see that they are good types of their breed. The heavy layer should have a deep, wedge-shaped body with plenty of room inside, and the pelvis bones should be fine and flexible. The head is the

best guide to the quality of a bird of either sex, but particularly the male. The comb should be bright and bold, the head rather long, the neck slim and graceful. The short-necked, heavy-headed bird is generally a poor one. The legs should not be too long, but set wide apart. Beware of the knock-kneed lanky specimen. These remarks, while brief, may serve as a warning and be helpful to beginners, because after all it is easy to make or mar success by the right or wrong mating. We will now presume that the stock has been mated correctly from which it is expected to raise the young flock. Hatching the eggs is the next step. The incubator is the best method, for the stock is bred at the right time, which means that if you feed correctly you have the egg profits coming in at the period when the maximum prices are obtainable. The first point is to fill the machine with good hatchable eggs. By this I mean eggs of good shape, smooth shell, and free from wrinkles. Discard all those which are mottled or are rough-shelled, because they seldom hatch. In about seven days examine them each separately before a lamp in a dark room (or at night) and you will then see which are infertile. Take all clear eggs out (these can be used in the kitchen); the remainder will remain in the incubator for another 14 days; during that time they should be aired and turned over twice daily. When 20 days have elapsed, you should be able to see the eggs chipping, and within the next two days all which are coming out will be ready to remove to the brooder. Do not feed the chicks for at least 48 hours after they are hatched. They are sufficiently provided for by nature when they left the egg to last over at least twice this period. Their main requirements are rest and warmth. Having passed the first day or two on the sand in the brooder, they can now be given water in shallow tins, or, better still, a jamtin, punch a small hole about three-quarters of an inch from the top, fill it with water, and invert it in a saucer. Sufficient water will come out, and rest in the saucer, and the tin will prevent the chicks getting into it. The first meal should be of coarse oatmeal or flaked oats. This can be continued for a few days. I feed a good deal of bran to my chicks by putting it in flat tins and having it always before them. Give green feed to them early. It must be chopped finely. Also keep shell grit in front of them, and do not forget to let them have plenty of fresh air. After about the second week they can be given cracked grain and soft food. The latter stretches the crop and is easily and quickly digested. Green feed is one of the most important items of the chick's menu, and it should be freely given—as much as they will eat. At five or six weeks they can be put on adult feeding. Meat meal is also a splendid food to bring them along if fed in moderate quantities. They need feed that will keep the birds healthy and robust. It is entirely in the hands of the poultry-keeper whether pullets lay in five months or wait until they are 10 months before making a start. The profitable fowl is the early-laying fowl, and early laying is a habit developed by breeding from early layers, by hatching the chickens at a time that will bring them to the laying stage in the early winter. Mongrel-bred flocks are perpetuated by breeding from layers of all ages at all times of the year, and from the hen which lays only 30 or 40 eggs a year as well as the more prolific members of the flock. Clear out the mongrel stock, forget the old methods, and start with good stock, and then you will realise to the full the profit-producing power of the hen. Poultry will pay handsome dividends on cost if given a reasonable chance. Give the poultry a chance to show what they can do by having good stock properly housed, fed, and cared for. Provide comforts for the birds and they will provide profits for you. If all do their utmost to raise more poultry, better poultry, and profitable poultry, it will be helping the world at large, profitable to yourselves, and a help to building up an important industry."

RENDELSHAM.

September 26th.—Present: 13 members.

VEGETABLE GROWING.—The following paper was read by C. H. Faerhman:—"Good methods of cultivation and early sowings are essential for the success of the vegetable garden, especially in dry districts. Without proper

cultivation the moisture supplies in the soil are quickly dissipated into the air, while early sowing is necessary to enable the crops to make a maximum amount of growth while conditions are suitable for their development. The garden should be well stocked with beans, peas, cabbages, cauliflowers, onions, turnips, and salad plants of various kinds. Liberal sowings of carrots and parsnips should be made at this time of the year, because these roots form a valuable standby. Under favorable conditions the root crops will attain useful size within three months, but in deep soil, where a moderate amount of moisture can be maintained, they will continue to grow throughout the summer months, and will continue to do so through the autumn and winter. The ground between the rows of all growing crops should be kept in a loose, open condition by surface cultivation. This is particularly important after rain has fallen in sufficient quantity to establish capillarity between the surface soil mulch and the moist layer below. When the crops have made sufficient headway, a liberal mulching of stable manure will further help to conserve moisture. The mulching does not do away with surface cultivation, and after a heavy rainfall the manure should either be moved aside to enable the soil to be loosened with the hoe or cultivator, or the digging-fork may be used to loosen the soil without moving the mulch. In small gardens it is generally necessary to stock the ground rather heavily in order to accommodate the variety of vegetables it is desired to grow. In such cases artificial waterings will be necessary during the dry weather to ensure a payable return from the area under cultivation. In gardens where ample space is provided it will pay to give plenty of room between the rows as well as between the individual plants. In farm gardens the cultivation may be carried out by means of horse-drawn implements, and hand work, even in weeding, may be greatly lessened. The principal advantage obtained from allowing wider spaces is that more moisture will be available for the growing vegetables. When moisture is conserved and the plants given more room, soil moisture is turned to the most profitable account. So long as there is sufficient moisture in the ground the moisture will move towards the point where it is being used. When evaporation is checked the only way of its escape will be through the plant itself, and it will be used for the growth of the plant. In districts where artificial watering cannot be practised, every effort should be made to get the summer vegetables as forward as possible while there is still sufficient moisture in the soil. Fresh horse manure is plentiful on farms and also in most districts, and by using the heat produced by its fermentation, young plants, such as tomatoes, melons, marrows, cucumbers, and other tender plants may be forced along, so that when finally planted out they have almost reached the fruiting stage. In the meantime the ground to be used for these plants should be well prepared by digging and manuring, and afterwards kept in a state of good fallow until the plants are put out. A considerable saving of time can also be effected by germinating French beans in moderate heat, and transplanting the seedlings in permanent positions during this month. The Canadian Wonder is a splendid dwarf bean and being a heavy cropper, rapidly comes into bearing. Seeds with a hard coating may be put into hot water and allowed to stand for 12 hours, when those that have swollen can be removed and planted. The Scarlet Runner bean is a good variety for late autumn use. It does not set well in summer, but if planted in well-worked soil it will survive the summer and yield an abundance of pods, aided of course, by autumn rains. French beans of any description may be cut and dried in the sun. These, when soaked and cooked, provide a good dish during the winter months when the green bean is unobtainable:''

KALANGADOO (WOMEN'S), October 13th.—A paper, ''Home Nursing,'' that had been forwarded by the President of the Saddleworth Women's Branch of the Agricultural Bureau was read and discussed, and the report of the delegates to the Annual Congress was received.

TATIARA, October 20th.—Mr. A. E. Milne read the paper, ''Farm Management and Efficiency,'' that had been presented at the Annual Congress, and a keen discussion followed.

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

No. 6. JANUARY 15, 1924. VOL. XXVII.

Published Monthly by the Department of Agriculture.

Edited by H. J. FINNIS.

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JOHN COWAN,
Minister of Agriculture.

POINTS FOR PRODUCERS.

Crop Competitions at Miltalie.

Recognising the possibilities for good that were likely to result from wheat-growing competitions in South Australia, the Government recently, on the recommendation of the Advisory Board of Agriculture, decided to subsidise competitions of this nature conducted under the auspices of Branches of the Agricultural Bureau. The first grant under these provisions has now been made to the Miltalie Branch. The competitions conducted by this Branch of the Bureau were open to wheatgrowers in the district council of Franklin Harbor. The minimum area of any entry was 100 acres, and the number of varieties that could be submitted in one entry was limited to three. Fourteen entries were received. Messrs. Arthur Venning and S. A. Wilson, both of Cowell, acted as judges. The following awards were made:—First, Mr. P. C. Wake, Elbow Hill, whose entry consisted of Gluyas and Currawa varieties; second prize, Mr. J. S. Jacobs, Miltalie (Currawa, Warren, and Major varieties); third prize, Mr. J. P. Story, Miltalie (Currawa, Bluey, and Major varieties). Mr. A. S. Brown acted as Hon. Secretary to the competitions.

Woolly Aphis.

The application of salt to the soil surrounding apple trees has been recommended as a means of controlling the woolly aphis, and with a view to testing the usefulness of this procedure, the Horticultural Instructor (Mr. George Quinn) recently instituted a series of tests at the Blackwood Experimental Orchard. Whilst it is too early yet to draw any definite conclusions as to the value of the practice, up till the present no effect is noticeable. During the past few weeks the pest has also been subjected to treatment with Black Leaf 40, a motor pump and spray pistol being used for the purpose of distributing the spray. Commenting on this, the Manager of the Orchard (Mr. R. Fowler) stated that the spray pistol was the most effective weapon he had ever used against woolly aphis. "The ease with which it can be manipulated and the force with which the spray can be concentrated on any particular spot makes it an invaluable weapon in the fight with woolly aphis," he continued. "The difficulty has always been effectively to get at the insects, owing to their natural protection; but the spray pistol has overcome that difficulty."

Thin Cream.

After having paid a visit to the Strathalbyn Butter Factory last month, the Assistant Dairy Expert (Mr. H. J. Apps) expressed the opinion that many suppliers were delivering too great a percentage of thin cream, which was resulting in too high acidity. Mr. Apps suggested that these producers should so alter the cream screws of their separators as to produce cream testing about 45 per cent. of butter fat.

He suggested, also, that producers might well make a practice of stirring the cream several times during each day. Mr. Apps further mentioned that the delivery of thin cream was not confined to suppliers in the Strathalbyn district, but at this time of the year, unfortunately, it appeared to be a general practice.

Pasture Plants at Mount Remarkable.

At the suggestion of the Department of Agriculture, one of the soldier settlers on the Mount Remarkable Estate, Mr. Roy Treglown, tried on his hills block a number of different pasture plants. Last week Mr. Treglown forwarded some specimens of these plants to the Department of Agriculture for the purpose of showing the growth made by Wimmera rye grass, Subterranean clover, and lucerne. The rye grass was over 1ft. in height, which, for the first season's growth, must be considered very satisfactory. The Subterranean clover had made plants 5ft. in diameter, and another satisfactory feature was that it had seeded extremely well. Amongst the plants forwarded were specimens of cluster and hop clovers, which had made very strong growth on land that had been dressed with superphosphate.

Director of Agriculture at Berri.

During last month the Director of Agriculture (Professor Arthur J. Perkins), accompanied by the Horticultural Instructor (Mr. George Quinn), paid a visit to Berri. On his return to Adelaide, the Director stated that he had never seen the Experimental Orchard at Berri in better condition, nor had he seen the trees making better growth. "The growth of the trees is magnificent," he remarked. "The fruiting of the currants and sultanas is exceptionally good. The muscatels, on the other hand, appear to be rather defective, owing, apparently, to low temperature conditions and cold winds at the time the vines were in bloom, as a result of which they are setting irregularly. The drainage scheme on the Experimental Orchard, which we particularly went to inspect, is working effectively. The trees on the edge of the salt patch, which were dying back, appear to be recovering, and there is every reason to believe that next autumn we shall succeed in raising a cover crop on the barren salt patch. The only difficulty that we appear to be faced with is that of leaching the ground rapidly and effectively on a rather steep incline. We are also taking into consideration the drainage of a flat tract of land, adjoining the river, which is gradually becoming salt laden as a result of drainage from irrigations of adjoining hill slopes. We propose to prepare a scheme to deal with this matter, and hope to make a start on the work during the current season. This piece of drainage should prove very useful to the settlement, because there are many other blocks at Berri that are affected in a similar manner." In the evening the Director and Mr. Quinn attended a meeting of the local Branch of the Agricultural Bureau and addressed the members on various points raised.

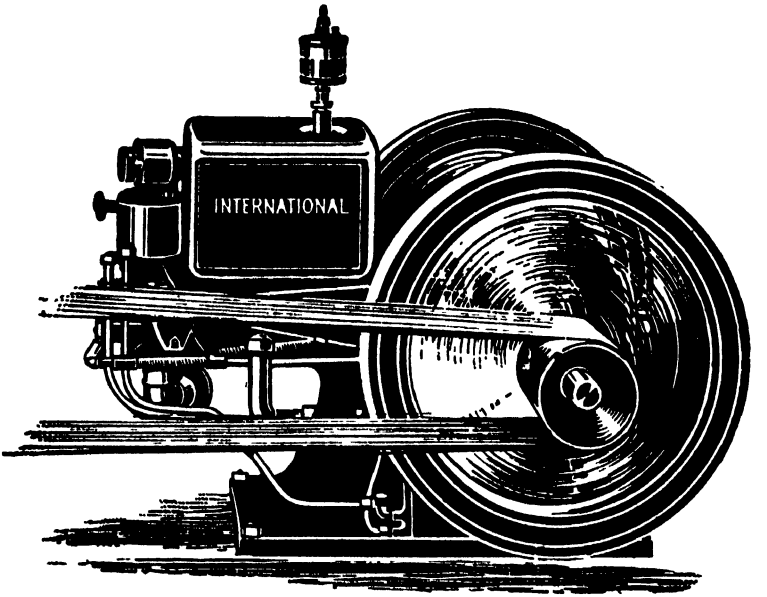
A Record Wheat Yield.

A yield of 110 bushels to the acre, on unirrigated ground said, by the University of California, to be "the largest recorded yield of wheat available from all sources in North America" has been reaped on the University Farm at Davis. The variety was Onas, which was originated by a South Australian wheat breeder and grower—Mr. F. Coleman of Saddleworth. Information recently received by the South Australian Department of Agriculture reveals that the seed of this variety was obtained by the United States Department from a single head of wheat sent in a letter from Australia. The seed from this head was increased until a sufficient amount of seed was grown to sow about 10 acres, in the fall of 1922, on the University Farm at Davis, California. The land was not fertilised in any way, and had not been. "No doubt this rest, and the lightness of the preceding crops had much to do with the very high yield of 110 bushels per acre," says the Assistant Professor of Agronomy in charge of cereal investigations. "The wheat was harvested by means of a small 10ft. Deering Combined Harvester, about the middle of June. The yield per acre of a 1/5 acre plot, selected, was 110 bushels per acre. For the whole field (10 acres), the yield was about 85 bushels. "The milling tests of Onas wheat at our sub-station at Kearney Park, in Fresno county, showed it to be very poor, while the tests from the Onas wheat at Davis were much better, although not equal to our best wheats. In the rod-row 1/50 acre replicated plots at Davis, Onas stood number five, but in the rod-row plots at Kearney, it stood number one in yield."

Harvesting the Pea Crop.

For many years, the officers of the Department of Agriculture, including the Director of Agriculture (Professor Arthur J. Perkins), the Superintendent of Experimental Work (Mr. W. J. Spafford), and the Principal of the Roseworthy Agricultural College (Mr. W. J Colebatch), have urged on landholders in the cereal growing districts of the State the necessity for growing leguminous crops in rotation with cereals. The experience of all countries producing crops has proved this practice to be the only practicable method of maintaining the fertility of the soil. In South Australia, peas can be grown satisfactorily in a majority of the districts in which the cereals are produced; and the chief reason that the area under this crop has been restricted, is the difficulty experienced up till the present in harvesting the grain. The need has been for a machine capable of directly harvesting the peas, and to take the place of the existing cumbersome method of cutting with a scythe or mowing with the grass cutter, cocking, transporting to a threshing ground and then rolling, or tramping with livestock.

Of course, some of the more advanced growers have gone to the extent of installing power threshers, stacking their peas and passing them through the thresher as opportunity offers, but even with this additional equipment the cost and difficulty of the operations are such



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as to militate against an increase in the area under peas, and in the number of farmers who would undertake to grow the crop. Recent improvements in harvesting machinery, however, suggest that these difficulties have now been overcome. On Thursday last, the Superintendent of Experimental Work (Mr. W. J. Spafford), and the Secretary of the Advisory Board of Agriculture (Mr. Harold J. Finnis), had an opportunity of inspecting a crop of peas that was being harvested on the farm of Mr. W. H. Jared at Port Noarlunga. A paddock of about 45 acres was carrying a good crop of Early Dunn peas, and this was being taken off by a McKay Sunlight header with a pea harvester attached. A count of the bags revealed the fact that the part of the crop that had been harvested was yielding from 10 bags to 12 bags to the acre. It was estimated by the manager of the farm, (Mr. Pike), that the quantity left on the ground was less than one quarter bushel to the acre, and there was so little to be seen that this estimate can be regarded as quite a safe one.

The nature of the sample can be judged from the fact that the grain was being sold direct from the field after the bags had been sewn, as taken from the machine. Despite the fact that the crop showed some evidence of having been attacked by caterpillars, there was a very small proportion of cracked grain. Provision has been made on the machine by the manufacturer to separate this cracked grain from the sample, but the hopper provided for the purpose had little to do.

There is every reason to anticipate that the perfecting of a machine for directly harvesting peas will have an immediate effect on the cropping practices of many of the cereal growing areas of the State. Directly landholders realise that the pea crop can be produced without that time involving and costly hand work that has been for so long inseparable from harvesting, there should be an extension in the area sown. The advantages associated with the crop have been recognised for years, and now that the mechanical difficulties of harvesting it apparently have been satisfactorily overcome, the pea crop should take its place in the crop rotation of the cereal growers.

Take-all.

The investigations being conducted in the laboratory of Plant Pathology at the University, which is working in conjunction with the Department of Agriculture with the object of throwing additional light on the take-all disease of wheat, are being watched with considerable interest by wheat growers. Crops in many portions of the State are reported to have suffered very badly from this disease during the season just closed. In order to secure definite data as to the extent of the damage done, the Lecturer in Plant Pathology at the University (Mr. G. Samuel, B.Sc.), is seeking the co-operation of the farmers. He is asking wheatgrowers to supply him with replies to the following questions:—(1). Which varieties of your wheat were affected with take-all? (2). Which were affected worse? (3). Which varieties of

your wheat were not affected with take-all? (4). What is the history of the land for the last three years of the most badly affected crop? Mention burning, early or late fallow, dry or wet worked, &c. (5). What is the history of the land for the last three years of your best crop? (6). What are the chief grasses in your pasture? (7). Did take-all affect the wheat early and make bare patches in the crop, or did it attack it later forming patches with grainless ears (whitehead stage)? (8). Has take-all been worse with you this year; if so, do you think it has any connection with the wet season? (9). Can you estimate the number of bushels loss from take-all in your crop this year? From the point of view of the State, as well as that of the individual, these investigations should prove of the utmost importance, and readers will be doing a public service by supplying the information sought in this questionnaire.

Flies.

From time to time the Department of Agriculture receives from farmers and others in rural districts requests for information as to the methods of controlling flies. A point that is frequently overlooked by those who are troubled with this pest is that there is little likelihood of effectively overcoming it simply by attempting to poison the flies that are already hatched. The treatment of breeding places, the manure heap in particular, is of the utmost importance. Investigations carried out by the United States Department of Agriculture suggest that the best method of destroying the larvæ in manure is to treat the heaps with borax at the rate of one pound to every 16 cubic yards of manure. In the tests conducted it was found that the best results were secured when the borax was applied in solution, or when water was sprinkled on after the borax had been scattered evenly over the refuse. It was found that borax was not only effective in killing the larvae, but when it came in contact with the eggs, it exerted a toxic action which prevented their hatching. A bait for the house fly said to have proved very effective, consists of a crust of bread sprinkled with sugar, and placed in a saucer containing 15 parts of water, or water and milk in equal parts, and one part of formalin. Another treatment that has been recommended is the following:—Make a solution of two parts of arsenate of soda, four parts of white sugar, and 40 parts of water. Into this solution place a stout unsized paper. After it has soaked, the paper should be removed and dried. When required for use it should be damped in water, and placed in a saucer.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

Hon. Secretary, Mannanarie Agricultural Bureau, asks—(1) Reason for death of ewes in lamb, two or three hours after being shifted from one paddock to another; the stomach swells and the sheep froth at the mouth. (2) Horse, after being released from work, rubs itself close to the sheath on a post.

Replies—(1) *Re* ewes in lamb dying: The deaths have been due to "bloating," which may easily be caused by a sudden change of pasture as from one paddock to another, particularly if the sheep are allowed to gorge themselves on fresh fodder. If carefully handled at the time of making the change, these bad effects can be mostly avoided. The sheep should only be allowed to take a limited quantity into their stomachs at a time, and then be held for a period of half an hour or so from grazing before they are allowed to go on feeding again. Handling them in this way until they get accustomed to the change will avoid the trouble you have had. This trouble appears more readily in pregnant ewes than in empty ones—only on account of the general physiological upset which occurs in all female animals concurrent with and dependent on the pregnant state. The provision of a good coarse salt and soda-bicarb. lick for sheep will serve as a worth-while preventive against bloating, and to treat affected animals take one teaspoonful each of bicarb. of soda and ground ginger, dissolve in half-pint of warm water, and give as a drench. If given early, this is usually an effective remedy. (2) *Re* horse rubbing over post. I presume that the spot he rests and rubs is on the abdomen, just in front of the anterior end of the sheath, or thereabouts. If my premise is correct, his action is indicative of infection with bots.

"J. C.," Tantanoola, asks reason for excessive scouring of stock when fed on ensilage.

Reply—Scouring is attributable in a general way to dietetic errors, which embrace (1) the quality of the feed, and (2) the general management of the feeding of it. Of the two above stated general causes, the former probably will contain the exact cause. It may very likely be that in the preparation of the ensilage, when the fodder is being packed into the silos, there are small pockets in it from which the air has not been properly excluded, and the result would be that decay of the vegetable fibres would be set up in them. When the ensilage was subsequently fed to the cattle, those of them which got these decayed portions in their ration would suffer the disability you mention, while the others of the mob which got only sweet, wholsesome portions of their ration, would escape the trouble.

Hon. Secretary, Big Swamp Agricultural Bureau, reports cow, first calf, giving milk tinged with blood.

Reply—The blood in the milk may be due to injury to the udder, or it may be due to over-rich feeding, or to some irritant plant taken in with the food in the paddock. If there is any bruising or injury, you must treat it. If there is no apparent injury to cause the condition, I would suggest you give a purgative

drench (Epsom salts 1lb., ginger 2 tablespoonfuls). Reduce her feed somewhat and try a change of pasture if possible. Keep udder and teats thoroughly clean, and milk her out carefully and gently.

Hon. Secretary, Blackheath Agricultural Bureau, asks method of dehorning cattle, and at what age the operation should be performed?

Reply—There is a very suitable and serviceable dehorning instrument on the market; but, failing this, the horns may also be divided by a clean, sharp, crosscut or tenon saw, and the stumps dressed with melted tar and bound by tow and string; or, if haemorrhage is severe, treated with a hot iron. Though this operatoon is a severe one, if properly done, no serious trouble follows; but if done in the summer time, care must be taken to see that the wounds do not become fly-blown, or the maggots that result therefrom may penetrate into the sinuses of the head. The operation is usually left until the horns are well grown.

"R. A. W.," Coomandook, has number of young sheep affected with blindness.

Reply—Place the affected sheep, if possible, in a shady situation. Bathe their eyes with a warm solution of boracic acid in water, so as to remove all discharge. Then drop into the affected eyes, so that it runs over all the eyeballs, a few drops of the following lotion:—Sulphate of zinc, 2 teaspoonfuls; boracic acid, 1 teaspoonful; distilled water, 1 pint. This treatment must be repeated two or three times daily until the eyes recover.

"F. A. S.," Lyndoch, reports cow with sore teats. An advertised preparation was applied, and after four days the cow was brought in with a limp udder. She gave a very small yield of milk, some of which was of a brown color. Subsequently the milk was lumpy and one of the teats is completely blocked.

Reply—You have set up in your cow's udder a serious condition, known as "mammitis," and permanently diminished her value as a milker. You cannot do more than keep the teats and udder thoroughly clean by frequent use of hot water to foment them, and keeping your own hands scrupulously clean, massage the udder and strip it out completely every couple of hours, even though you only get a cupful at a time. Destroy this milk. Beyond this treatment, you must leave the rest to the natural resistance of the beast to effect recovery; but I doubt if you will ever find her of much economic value to you again as a milker.

"H. J. G.," Cradock, has pony, 12 years old, falls down in harness as though in a fit.

Reply—Your pony suffers from a condition known as "vertigo," in common parlance it would be said that it faints. With respect to the cause of this condition, in many cases, disturbances of digestion exerts an important effect; in other cases it may arise from certain diseases of the brain, heart, and blood vessels; and quite often no cause at all can be determined. A horse once affected may be subject to further periodical attacks; in other cases it may never recur. The only palliative that can be suggested is to pay careful attention at all times to dieting and the administration periodically of a good cathartic dose of medicine (aloes) to keep the blood in as pure a condition as possible.

"A. A. J.," Mount Bryan, has young heifer with very hard udder and lump under the belly.

Reply—Your heifer appears to be suffering from a congested condition of her udder, incidental to and consequent upon the calving and her coming into milk for the first time. Apply hot foments frequently, taking care to avoid subsequent chilling. When rubbing in oil, massage gently but thoroughly. Milk her out frequently, and at all times be thoroughly clean in everything. The condition should, with care, reduce in a week or so. The swelling along the belly is only oedema, and will disappear as the udder condition works off. You could with advantage give the heifer a good drench of Epsom salts 1lb., ginger 2ozs.

"J. K.," Auburn, has pony gelding with swollen jaws and mouth, which later extended to the chest and belly. The sheath and stifle are also swollen.

Reply—Your pony evidently is out of sorts and requires a good tonic. If you are hand feeding him, damp his feed and put a couple or packets of Epsom salts in the feed night and morning for a few days. Get a dozen of the following powders made up:—Pulv. nux vomica, 1 dram.; P. gentian root, 3 drams. Give him one of these powders night and morning, a quarter to half an hour before feeding. The easiest way to give these is to mix the powders in a spoonful of treacle or honey to make a stiff, sticky paste. Pick this up on the end of a

smooth, flat piece of stick, and opening his mouth and pulling tongue out with one hand, smear the stuff over back of tongue and on his back teeth, so that it sticks there and he has to lick it down.

"Mrs. E. N.," Seven Hills, reports cow, calved week ago, which has lost her appetite and breathes rapidly. Milk flow is considerably reduced.

Reply—Your cow may be suffering from a septic condition of the breeding bag, following on the calving, and due to retention of a small portion of the afterbirth. I recommend repeated douching of the passage with plenty of warm water in which a few crystals of Condy's have been dissolved, adding only enough to color the water a pink tinge. Repeat this douching at least twice daily until improvement takes place. Give the following medicine:—Nux vomica, 2 teaspoonfuls; powdered gentian root, 1 tablespoonful. Mixed in a spoonful of treacle to form a sticky paste and place it on the cow's tongue and back teeth with a short piece of stick. Repeat the dose night and morning.

"G. K.," Mount Gambier, asks reason why cows fail to get in calf.

Reply—When cows fail to get in calf readily, it is due to some diseased condition of the sexual organs, and the condition of the pasture on which they are being fed has no bearing on the matter, nor will the administration of any medicine by the mouth be of any avail. Local treatment by douches, &c., applied to the passage and breeding bag are necessary to effect any good, and as the most satisfactory treatment to use will depend on the cause, an examination of the genital organs of the cows should be made to try to discover the exact diseased condition. You could try the following.—Douch cows once daily with lukewarm solution of corrosive sublimate, strength 1 to 4,000. When the cows are first noticed to be "in season," douch instead with a lukewarm solution of soda bicarbonate in water, and put them to the bull an hour later.

"R. H. R.," Clare, has mare with bruise just above hoof. Swelling has taken place, which now extends up the leg into the shoulder.

Reply—Your mare is suffering from blood poisoning in the leg that was injured some time ago. I would recommend you to give her a good dose of physic to commence with, and subsequently keep her on green feed, or, if such is not available, sloppy bran and chaff with a handful of Epsom salts in it night and morning. Immerse the leg daily in a bucket of hot water containing some antiseptic, so that the water covers the site of the injury. Keep the leg in this for half an hour at a time, and keep adding fresh hot water from time to time, so as to keep the bath hot. In between times of soaking, keep the wound covered with an antiseptic pack. By this means you may arrest the progress of the blood poisoning and ultimately restore the leg to its normal condition.

Hon. Secretary, Mannanarie Agricultural Bureau, reports horse which rubs sheath on post or rail after being unharnessed.

Reply—The horse is probably suffering from irritation inside the sheath, due to a dirty condition there, such as a collecton of smegma (grease). Use some warm water and soap and clean out the inside of the sheath as thoroughly as possible. With gentle manipulation, it would be possible to seize the end of the penis in the hand inserted into the open end of the sheath and draw it out, so as to facilitate cleaning.

Hon. Secretary Rapid Bay Agricultural Bureau, Second Valley, asks if one quarter of a cow's udder is affected with mammitis, would the milk in the remaining quarters be fit for human consumption.

Reply—Yes, providing it was drawn free from contamination by milk from the affected quarter.

Hon. Secretary, Agricultural Bureau, Clarendon, reports— (1) Bull with swollen sheath, and (2) litter of pigs weak in the back, now being fed on milk pollard, and barley.

Reply—(1) *Re* bull with swollen sheath: The condition is probably due to collection of sebaceous material inside the sheath, setting up irritation, and consequent inflammation and swelling. Treatment consists in cleaning out the sheath thoroughly with mild injection of soapy warm water, and subsequently injecting the sheath daily with a mild, non-irritating solution (such as boracic acid solution in water) until inflammation and soreness subsides. If the opening at the free end of the sheath is too small to permit of protrusion of penis, it would have to be enlarged sufficiently with a sharp, clean knife, an operation which can be

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readily performed and without danger, providing antiseptic precautions are taken. (2) *Re* young pigs: Your pigs would appear to me to have been inclined to be "ricketty," a condition whiih would come to them from their dam. Sows heavy in pig require good liberal feeding on rich quality food and have plenty of exercise, to enable her to produce and rear a strong, healthy litter, and it is likely that your management of her may have been somewhat lacking in this respect. The foodstuffs you are now giving the young pigs is all right, and, in fact, just the very thing to combat any tendency to ricketts. That it is satisfactory is shown, too, in the results that the young pigs have improved after being fed on it.

"R. B.," Bool Lagoon, has two draught mares, lame in front feet. The feet are hot to the touch, and swollen where the hoof joins the hair of the leg.

Reply—Your horses appear to have suffered from an injury to tne front of the foot, just by the coronet; most likely they may have pricked themselves with a thorn, or even a piece of barbed wire. Hot foments to the parts until the soreness disappears and discharge commences to form, and subsequently antiseptic washings of the wound till the discharge stops, should be all that is required. Examine the site of the wound carefully to see that there is no small stake (such as a thorn or splinter of wood) present, which would have to be removed before healing would take place.

"J. W. W.," Port Lincoln, reports blindness in sheep.

Reply—At this time of the year there is generally a good deal of this trouble prevalent amongst sheep, and many term the condition as "pink eye." The blindness is usually caused by dust and the pollen of seeding pasture grasses, which gets into the sheep's eyes, causing irritation and subsequent blindness. Flies will help to spread the complaint once it appears. The sheep should be kept, if possible, on short grass country, and to treat the affected ones bathe the eyes well in a lukewarm solution of boracic acid and water and fill them up with plain white powdered sugar, two or three dressings of which are usually effective in most cases. Another useful lotion is—Zinc sulphate 1 teaspoonful, boracic acid 1 teaspoonful, distilled water ½ pint; a few drops to be put in the eyes three or four times daily.

"C. W. D.," Keith, has cow, fortnight after calving had violent fit Lost use of legs.

Reply—Your cow is suffering from eclampsia, arising out of calving. You should commence treatment by administering the following drench:—Epsom salts 1lb., ground ginger 4 tablespoonfuls, treacle or molasses 1lb., warm water 1 quart. Once you have got the bowels well opened with this, keep them on the slack side a bit by putting a handful of Epsom salts in damped feed night and morning for a week. Irrigate the back passage daily with fairly hot water in which two or three crystals of Condy's have been dissolved. Continue this douching for a week, or longer if there is still any discharge.

REMOVING SALT FROM BRACKISH WATER.

"H. T." asks:—"Will quicklime freshen brackish water, seeing that quicklime mixed with salty soil converts the salt into carbonate of soda?" The Director of Chemistry (Dr. Hargreaves) replies:—"It may be answered that quicklime will not convert salt (sodium chloride) into carbonate of soda either in the soil or in water, or anywhere else. I do not know of any type of brackish water in this State that would be improved for agricultural use by the addition of quicklime. Some waters which are brackish contain also high proportions of carbonate of lime, and these waters can be improved for technical purposes (washing, boiler use, &c.) by the correct addition of quicklime. Again, some "sour" waters are improved for all purposes by the addition of quicklime in the proper proportion. Our brackish waters are, however, in practically all cases alkaline in reaction, and do not need quicklime. There is no method that will remove the salt from brackish water except distillation."

Elbow Hill Branch of the Agricultural Bureau asked whether it was advisable to sow seed wheat reaped from a crop affected with "flag smut," or black rust; also, whether a crop grown from affected seed would be likely to be affected the next year.

The Director of Agriculture (Professor Arthur J. Perkins) replies:—"Seeing that the plants affected with "flag smut" die back early in the season, and long before seed has formed and matured on growing crops, there does not appear to be much likelihood of seed from a field more or less affected with black rust transmitting the disease by direct infection of the seed. Infection usually takes place through the soil. The fact, however, cannot be overlooked that the wind may possibly convey germs of the disease on to neighboring healthy plants. Should, however, this be the case, it is almost certain that effective pickling with bluestone will destroy any stray germs that may have attached themselves to the seed."

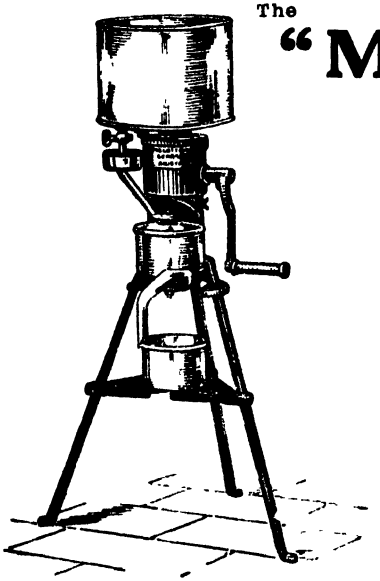
DEPTH OF PLOUGHING.

The Glossop Branch of the Agricultural Bureau sought the advice of the Superintendent of Experimental Work (Mr. W. J. Spafford) as to the depth to which orchards in that district should be ploughed.

In reply, Mr. W. J. Spafford said:—"From every point of view, relatively deep ploughing will be advantageous in the Glossop district, and the first ploughing each winter of orchards and vineyards should be at least 10in. in depth. As a matter of fact, there is every probability of very marked benefit being secured from subsoiling these lands every few years; then the land would be ploughed 10in. in depth and subsoiled another 10in., making a total depth of 20in. of cultivated soil. With really deep cultivation, less water will be required for maximum returns, and the ever-present danger of the concentration of injurious salts at the surface will be reduced."

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REPORT ON THIRD YEAR OF OPERATIONS OF THE RIVER MURRAY HERD TESTING ASSOCIATION.

[By ARTHUR J. PERKINS, Director of Agriculture.]

The River Murray Herd Testing Association completed its third year of operations on the 30th of September, 1923. The present report, besides indicating results achieved during the year, covers a review of the three years during which the Association has been in existence.

THE 1922-23 COMBINED ASSOCIATION RESULTS.

The combined results of the Association in 1922-23 are shown below in Table I.:—

TABLE I.—*Showing Combined Results of River Murray Herd Testing Association for* 1922-23 *Season.*

Months.	Mean Cows.		Milk		Butter Fat		
	In Herds.	In Milk.	Association.	Per Cow.	Test.	Association.	Per Cow.
1922-23.			Lbs	Lbs.	%	Lbs	Lbs
October	278 17	223 97	180,443	648·68	4·15	7,494·59	26·94
November.....	246·31	203·83	141,938 5	576·26	4·29	6,087·62	24·72
December ..	252 00	210 75	156,610	621·47	4·30	6,735·79	26·73
January	255·98	222·23	169,325	661·45	4·36	7,385·54	28·85
February	262·04	234·35	154,305 5	588·86	4·41	6,808·37	25·98
March	270 32	232·16	157,875	584·03	4·65	7,339·71	27·15
April	274·44	232·29	144,613 5	526·94	4·55	6,573 55	23·95
May	287·36	245·31	156,767·5	545·54	4·54	7,123·93	24·79
June	284·84	244·54	144,485	507·25	4·52	6,537·02	22·95
July	287·36	241·96	155,955·5	542·72	4·41	6,879·76	23·94
August	282·45	235·84	167,602·5	593·39	4·18	7,010,72	24·82
September	278·02	233·30	184,554	663 82	4·18	7.721·43	27·77
Means	271·61	230·04	—	7,048·68	4·37	—	308·16
Total production for year ..			1,914,475	—	—	83.698·03	—

The River Murray Herd Testing Association is to be congratulated on these results, which, from the point of view of the combined herds, are in reality more meritorious than would appear on the surface. It should be pointed out here that in the 1922-23 season the Association lost their leading herd, which by its fine performances contributed much to the successes of the preceding two seasons. How much Mr. Halliday's herd counted in this connection will be made clear by the following facts:—

In 1920-21 Mr. Halliday's herd represented 15.1 per cent. of the cows of the Association, and produced 20.7 per cent. of the milk of the Association. In 1921-22 his cows represented 17.1 per cent. of the

total number in the Association, and they were responsible for 23.4 per cent. of the total milk production.

Hence, in the absence of Mr. Halliday's herd, the mean milk production per cow in the Association would have been 640.05galls., instead of 685.32galls. in 1920-21, and 646.67galls. instead of 699.95galls. in 1921-22.

Similarly, had Mr. Halliday's herd been represented in the 1922-23 tests, and continued its 1921-22 rate of production, the Association mean yield per cow would have been about 744galls., instead of 704.87galls.

In the circumstances it follows, therefore, that mean improvements per cow on the 1921-22 yields of 4.92galls. of milk and 1.86lbs. of butter fat are far more satisfactory than they appear to be. If we exclude Mr. Halliday's cows from the 1921-22 season, they represent, from the point of view of the remaining combined herds, actual improvements of 64.82galls. of milk and 14.67lbs. of butter fat respectively.

Actual improvements realised since 1920-21 can be brought out more clearly by an examination of the mean results achieved by the five herds represented consistently in the three seasons, namely :-

Herds 1/C, 1/E, 1/J, 1/L, and 1/M These results are summarised in Table II. :—

TABLE II.—*Showing Mean Results of the Five Herds Represented Throughout the Three Seasons.*

Herds.	Mean Milk per Cow.			Mean Butter Fat per Cow.		
	1920-21.	1921-22.	1922-23.	1920-21	1921-22.	1922-23.
	Galls.	Galls.	Galls	Lbs.	Lbs.	Lbs.
1/C	715·53	898·30	914·91	294·79	362·17	363·87
1/E	636·30	650·70	673·15	303 98	295·87	295·27
1/J	680·17	605·27	643·46	308·72	282·23	289·74
1/L	629·41	621·85	696·23	290 05	296·69	315·85
1/M....	469·41	540·69	583·53	223·61	255·08	291·15
Means...	648·42	692·57	719·82	285·87	305·83	315·76
Increase	—	44·15	27·25	—	19·96	9·93

Hence, since the first season, the mean improvement in these five herds has been represented by by 71.4galls. of milk and 29.89lbs. butter fat. At 10d. per gallon for milk this represents mean improvement in gross production per cow of £2 19s. 6d. per annum.

Similarly, for eight herds represented in the second and third years, the mean improvements per cow were represented by 62.47galls. of milk and 23.92lbs. of butter fat respectively.

We may conclude, therefore, that from the point of view of the Association as a whole, the 1922-23 results are very satisfactory.

Finally, the results of the three seasons have been summarised and contrasted in Table III:—

TABLE III.—*Contrasting Summarised Results of Three Seasons.*

	1920-21.	1921-22.	1922-23.
Mean cows in herd	305·52	290·53	271·61
Mean cows in milk	256 23	235·61	230·04
Mean milking percentage	83·9 %	81·1 %	84·7 %
Mean milking period	306 days	296 days	309 days
Mean milk yield	685 32galls.	699·95galls.	704·87galls.
Mean butter fat test	4·36 %	4·38 %	4·37 %
Mean butter fat yield	298·63lbs.	306·30lbs.	308·16lbs.

MILK YIELD FROM MONTH TO MONTH.

It is of interest to note the extent to which the time of the year affects milk yields in any given district. Data concerning this point on the River Murray have been summarised in Table IV. for the three seasons.

TABLE IV.—*Showing Mean Daily Milk Yields, Month by Month, During the Three Years' Operations of the River Murray Herd Testing Association.*

	1920-21. Galls.	1921-22. Galls.	1922 23. Galls.	Means. Galls.
A.—RELATIVELY TO ALL COWS IN HERDS—				
October	2·06	2·13	2·09	2·09
November	2·00	1·98	1·92	1·97
December	1·92	2·06	2·00	1·99
January	1·93	2 05	2·13	2·04
February	1·78	2·03	2·10	1·97
March	1·71	1·87	1·88	1·82
April	1·81	1·68	1·76	1·75
May	1·78	1·67	1·76	1·74
June	1·73	1·84	1·69	1·75
July	1·83	1·82	1·75	1·80
August	1·91	1·92	1·91	1·91
September	2·08	1·99	2·21	2·09
Means	1·88	1·92	1·93	1·91
B.—RELATIVELY TO COWS ACTUALLY IN MILK ONLY—				
October	2·49	2·58	2·60	2·56
November	2·35	2·41	2·32	2·36
December	2·24	2·47	2·40	2·37
January	2·22	2·49	2·46	2·39
February	2·10	2·42	2·35	2·29
March	2·10	2·25	2·19	2·18
April	2·11	2·08	2·08	2·09
May	2·07	2·04	2·06	2·06
June	2·05	2·28	1·97	2·10
July	2·22	2·28	2·08	2·19
August	2·38	2·48	2·20	2·38
September	2·62	2·61	2·64	2·62
Means	2·24	2·36	2·28	2 29

These data show how remarkably even are the milk yields of the River Murray herds from one end of the year to the other. Relatively to the total number of cows in the herds, whether dry or in milk, we

see the milk yields to have averaged 2galls. a day over a period of seven months, *i.e.*, from August to February, inclusively, and 1¾galls. over the remaining five months, *i.e.*, from March to July.

Similarly, relatively to cows actually in milk and exclusive of dry cows, mean milk yields have been about 2½galls. from August to February, and 2galls. for the balance of the year.

Butter Fat Yields.

The mean butter fat yields for the three years have been summarised on similar lines in Table V.:—

Table V.—*Showing Mean Butter Fat Tests and Mean Daily Butter Fat Production, Month by Month, for a Period of Three Years* (a) *Relative to Total Cows in Herds, and* (b) *Relative to Cows in Milk.*

1920-23.	Mean Butter Fat Tests	Mean Daily Butter Fat Production Relatively to Total Cows.	Relatively to Cows in Milk.
	%	Lbs.	Lbs.
October	4·20	0·88	1·07
November	4·17	0·82	0·98
December	4·26	0·85	1·01
January	4·29	0·87	1·03
February	4·38	0·86	1·00
March	4·53	0·83	0·99
April	4·51	0·79	0·94
May	4·58	0·80	0·94
June	4·49	0·79	0·94
July	4·50	0·81	0·99
August	4·30	0·82	1·03
September	4·29	0·90	1·08
Means	4·37	0·84	1·00

Here, again, we may note extraordinary regularity in butter fat production from one end of the year to the other. From the point of view of the total number of cows in the herds, the extreme monthly variation is between 0.79lbs. and 0.98lbs., *i.e.*, about 1-10 of a pound; and from the point of view of cows actually in milk 1.08lbs. and 0.94lb., *i.e.*, about 3-20 of a pound. The mean percentage tests, on the other hand, show more pronounced variations, being highest in the months of declining milk supplies.

The relations between milk and butter fat production and percentage tests has been expressed graphically in an accompanying illustration. (*See* page 537.) It may be recalled that these results represent the means of three consecutive seasons, and concern in the aggregate an average of 291 cows per annum.

The relative horizontality of the mean daily butter fat production graphs tend to show that butter fat production is to all intents and purposes a fixed quantity from one end of the year to the other. On the other hand, the convexity of the butter fat percentage graph corresponds to the concavity of the mean daily milk production graphs; or, in other words, a high test implies reduction in milk supplies, and *vice versa*, the result of which is comparative uniformity in actual butter fat production from one end of the year to the other, notwithstanding seasonal variations in percentage tests.

On the whole, I am of the opinion that these mean returns do credit to the Murray Bridge dairymen. Doubtless they can and will be improved upon. Nevertheless, their evenness is such as to indicate that the cows are reasonably fed and cared for throughout the year, and this probably is one of the most important steps in progressive dairying.

Individual Herds.

In Table VI. have been summarised the results achieved by individual competing herds:—

Table VI.—*Showing Results Achieved by Competing Herds in* 1922-23.

Herd.	Period under Test.	Mean Cows in Herd.	Mean Cows in Milk.	Milk Production.		Mean Butter Fat Test.	Butter Fat Production.	
				Total.	Per Cow.		Total.	Per Cow.
	Months.	Cows.	Cows.	Lbs.	Lbs.	Per cent.	Lbs.	Lbs
1/C ..	12	30·85	25·84	282,263·5	9,149·09	3·98	11,224·40	363·87
1/U ..	12	14·67	12·14	117,816	7,965·67	4·32	5,090·16	343·15
1/T ..	12	11·68	9·46	75,782·5	6,181·27	5·06	3,835·05	327·10
1/Y ..	12	21·76	18·69	162,053	7,521·71	4·23	6,851·79	318·72
1/L ..	12	17·69	14·48	124,720·5	6,962·31	4·53	5,645·22	315·85
1/R ..	12	13·73	10·96	83,769·5	6,071·05	4·91	4,111·63	298·97
1/E ..	12	21·50	18·90	145,018	6,731·53	4·39	6,370·52	295·27
1/M ..	12	22·19	17·84	129,315	5,835·33	5·00	6,470·58	291·15
1/J ..	12	20·91	17·84	133,087	6,434·55	4·52	6,013·82	289·74
1/X ..	12	18·84	16·44	123,845 5	6,578·25	4·37	5,414·47	287·23
1/Z ..	12	19·54	15·59	125,464·5	6,374·08	4·40	5,519·42	281·55
1/W .	12	14·62	13·48	108,316·5	7,466·34	3·77	4,082·81	280·93
1/A$_A$.	11	6·54	5·66	45,390 5	6,998·72	4·47	2,027·62	312·28
1/B$_B$.	11	8·59	7·45	50,796	5,946·68	4·44	2,256·55	265·03
1/Co..	10	14·36	11·83	70,800·5	4,749·09	4·24	2,999·63	201·64
1/V ..	8	15·13	14·96	65,709	3,402·21	4·52	2,967·92	194·84
1/A ..	2	14·47	13·89	18,162	1,250·04	4·66	847·04	58·34
1/O ..	1	48·97	36·81	38,310	782·32	3·86	1,477·53	30·17
1/I ..	1	14·71	13·71	13,855·5	941·91	3·55	491 87	33 44
Means	—	17·34	14·68		7,048·68	4·37		308·16
Total production				1,914·475lbs. Milk			83,698·03lbs. Butter Fat	

We should note that in the 1922-23 season 12 herds exceeded the 600galls. mean, one of which was only 11 months under test; four exceeded the 700galls. mean, and one the 900galls. mean. Similarly, six herds exceeded the 300lbs. of butter fat mean, one of which was only 11 months under test, and one herd the 350lbs. mean. These results compare favorably with those of preceding seasons, which are summarised below:—

	1922-23	1921-22.	1920-21
Herds exceeding 900galls. mean	1	1	1
Herds exceeding 800galls. mean	1	2	1
Herds exceeding 700galls. mean	4	6	4
Herds exceeding 600galls. mean	12	9	11
Herds exceeding 350lbs. mean	1	3	1
Herds exceeding 300lbs. mean	6	6	5

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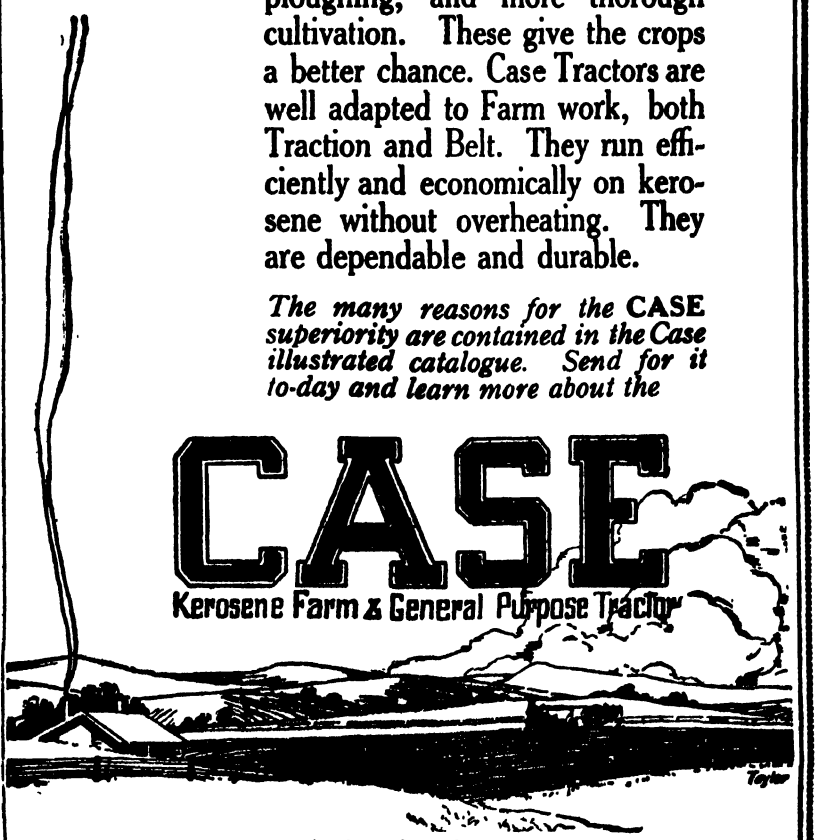
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PRIZES.

The following herds qualified for Government prizes in 1922-23:—

First Prize.—Mr. C. J. Morris's herd, 1/C, with a mean yearly output of 363.87lbs. butter fat from 914.91galls. of milk.

Second Prize.—Mr. L. J. Foster's herd, 1/U, with 343.15lbs. of butter fat from 769.57galls. milk.

Third Prize.—Mr. M. S. Cheetham's herd, 1/T, with 327.10lbs. of butter fat from 648.13galls. of milk.

THE COMPETING HERDS.

The task of inspecting and reporting upon the competing herds at the end of the year's operations has always been carried out by the Assistant Dairy Instructor, Mr. H. J. Apps. In connection with the 1922-23 seasons he reports in general terms as follows:—

"Upon my third annual inspection of the herds of the members of the Murray Bridge Herd Testing Association, I could not help noticing the vast improvement which has taken place in the general condition and type of the cows, especially in the herds of the original members. The general condition of all the herds is exceptionally good, and not in any case did I notice any cows in low condition; and considering the cattle have just gone through a very wet season, it conclusively proves that they must have received very good treatment. It is indeed very pleasing to report that to-day the benefit of herd testing is bearing fruit, and some of the vital points in connection with successful dairying, viz., better breeding, feeding, and the culling out of unprofitable cows, is convincingly demonstrated. During my first visit it was surprising to notice the number of inferior herd bulls; but qute a transformation scene has taken place in this direction, for in every herd of the original members a pure-bred bull is kept and several of the sires have good milk and butter production at their back, and it is worth noting that quite a number of them are prize takers at various shows, including championships at the Royal Agricultural Society.

Only in one instance did I inspect a bull of the present members that cannot claim purity of blood; but in this case it might be pointed out that none of this animal's progeny is being reared. The wisdom of heading the herd with a pure-bred sire was pointed out to the owner, and no doubt, as the records of the cows become known, he will fall into line with the others and secure a worthy sire.

Not only in one or two herds was it strikingly noticeable that great improvement had taken place both in condition and degree of uniformity, but practically every herd has shown marked improvement, which is especially noticeable when contrasting them with neighboring stock.

At last it is becoming apparent that the members are breeding with some definite object in view, either by the introduction of pure-bred cows or by grading up the herd.

Members realise and appreciate the value of such societies, and although the terms of the Government subsidy expire on the completion of the third year, nevertheless they are particularly anxious that its operations should not be allowed to lapse."

HERD 1/C—MR. C. J. MORRIS.

Mr. Morris is to be congratulated on having secured the position of winning herd for 1922-23. In 1920-21 he occupied seventh place; in 1921-22 second, and in 1922-23 first place. These successes must be highly gratifying to him. Mr. Apps reports as follows on his herd:—"This herd of 33 cows consists of fine, high-grade Friesians; they are in great milking condition. Three years' work of culling, together with the introduction of a few heifers, have brought about a wonderful degree of uniformity in type. The knowledge of the performance of the cows, and the services of a good type of Friesian bull, with great production records at his back, should eventually lead to further improvement. This herd has probably made the greatest improvement of any in the society, and reflects great credit on its owner."

In view of the excellent results secured by Mr. Morris, it will be of interest to contrast his returns over the three seasons:—

TABLE VII.—*Contrasting Results from Mr. C. J. Morris's Herd over Three Seasons.*

	1920-21.	1921-22.	1922-23.	Total Improvement.
Mean number of cows in herd	45 07	27·99	30·85	—
Mean number of cows in milk	36·54	23·57	25·84	—
Percentage of cows in milk —	81·07	84·21	83 11	—
Mean milking period days	296	307	306	—
Mean milk per cow per annum.....galls.	715·53	898 3	914·91	199·38
Mean butterfat per cow per annum. lbs.	294·79	362·17	363·87	69·08
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Mean value of output at 10d. per gall. .	29 16 3	37 8 7	38 2 5	8 6 2

It will be noted that since herd testing started, Mr. Morris's herd has improved its mean output of milk per cow by approximately 200galls., and the mean output of butter fat by 69lbs. The increase in value of the output of milk per cow at current wholesale milk prices is represented by £8 6s. 2d. Such results should prove a good advertisement for the value of herd testing to the dairyman, and incidentally to the State.

In 1922-23 Mr. Morris's herd was composed as follows:—

Heifers on their first calf	9
Three-year-old cows	3
Four-year-old cows	2
Five-year-old cows	2
Aged	17

It will be noted that the proportion of heifers on their first calf—over 27 per cent. of the total herd—was rather high, and leads one to anticipate that mean yields should be considerably higher next season.

Herd 1/U—Mr. L. J. Foster.

Mr. Foster's herd secured second place in the 1922-23 season: it was third in 1921-22, but was not represented in 1920-21. Mr. Apps reports as follows on this herd:—"The 13 cows of this herd include grade Friesians and a few Shorthorns and Jersey crosses. They are in tip-top milking condition."

Heifers on their first calf	4
Four-year-old cows	1
Five-year-old cows	2
Aged	6

The results of the two years' tests are contrasted below in Table VIII.:—

Table VIII.—*Contrasting Results from Mr. L. J. Foster's Herd over Two Seasons.*

	1921-22.	1922-23.	Improvement.
Mean number of cows in herd	12·70	14·67	—
Mean number of cows in milk	10·63	12·14	—
Percentage of cows in milk	83·70	82·75	—
Mean milking period days	306	302	—
Mean milk per cow per annum galls.	778·46	796·57	+ 18·11
Mean butterfat per cow per annum lbs.	353·07	343·15	— 9·92
	£ s. d.	£ s. d.	£ s. d.
Mean value of output at 10d. per gall.	32 8 9	33 3 10	+0 15 1

Although, on the whole, Mr. Foster's results are satisfactory, his herd cannot be said to have made much progress in the second season. Indeed, in the matter of mean butter fat per cow, there has been a decrease of close on 10lbs. per cow.

Herd 1/T—Mr. M. S. Cheetham.

Mr. Cheetham's herd, which was tenth in 1921-22, secured third place in 1922-23. It was not represented in the Association in 1920-21. Mr. Apps reports as follows on this herd:—"This herd of 13 cows consists of grade Jerseys. They are in splendid milking condition. The herd sire is a Jersey."

In 1922-23 the herd consisted of:—

Heifers on their first calf	5
Three-year-old cows	3
Four-year-old cows	1
Five-year-old cows	3
Aged	1

Again the high proportion of young cows—over 35 per cent. of heifers on their first calf—leads one to anticipate a much higher output in the near future.

The results of the two seasons have been contrasted below in Table IX.:—

TABLE IX.—*Contrasting Results Secured by Mr. Cheetham's Herd in Two Seasons.*

	1921-22.	1922-23.	Improvement
Mean number of cows in herd	13·11	11·68	—
Mean number of cows in milk	10·35	9·46	—
Percentage of cows in milk	78·95	80·99	—
Mean milking period	288 days	296 days	—
Mean milk per cow per annum	559·91galls.	648·13galls.	88·22
Mean butterfat per cow per annum	281·62lbs.	327·10lbs.	45·48
Mean value of output at 10d. a gallon	£23 6 7	£27 0 1	£3 13 6

Mr. Cheetham is to be congratulated on the improved results of the second season. His milk output has increased by 88.22galls. per cow, or 15.76 per cent., which at whole milk prices represents an increased gross return of £3 13s. 6d. per cow. His butter fat output has increased by 45.48lbs. per cow, or 16.14 per cent. These results are very encouraging, and it is to be anticipated that Mr. Cheetham will improve upon them next year.

HERD 1/Y—MR. S. G. STARR.

Mr. S. G. Starr, who joined the Association in 1922-23, is to be congratulated on securing fourth place for his herd, with a mean output of 318.72lbs. of butter fat from 752.17galls. of milk per cow. This herd consists almost entirely of young animals, eight out of 24, or 33 per cent., being heifers on their first calf. There is, therefore, every reason to anticipate early improvement in yields. Mr. Apps reports as follows on this herd:—"This herd consists of 24 cows of Jersey and Shorthorn crosses in really first-class milking order. The herd bull is a Jersey."

HERD 1/L—MR. H. H. CLARK.

Mr. Clark has been a member of the Association since its earliest days, and is to be congratulated on securing in 1922-23 a mean output of butter fat per cow of 315.85lbs. from 696.23galls. of milk. Mr. Apps reports as follows on this herd:—"This herd of 18 cows consists of Jersey and Shorthorn grades, which are in great milking condition. The herd sire is a Friesian, the owner having definitely decided to grade his herd to Friesian blood."

Mr. Clark's results over the three seasons have been contrasted in Table X.:—

TABLE X.—*Contrasting Results Secured by Mr. Clark's Herd during Three Successive Seasons.*

	1920-21.	1921-22.	1922-23.	Total Improvement
Mean number of cows in herd	12·96	13·99	17·69	—
Mean number of cows in milk	10·85	11·58	14·48	—
Percentage of cows in milk	83·72	82·77	81·85	—
Mean milking period	306 days	302 days	299 days	—
Mean milk per cow per annum	629·41galls.	621·85galls.	696·23galls.	66·82 galls.
Mean butterfat per cow per annum	290·05lbs.	296·69lbs.	315·85lbs.	25·80lbs.
Mean value of output at 10d. per gallon	£26 4 6	£25 18 2	£29 0 2	£2 15 8

Thus, then, in the third season Mr. Clark has improved his mean output of milk per cow per annum by 66.82galls., representing at current prices £2 15s. 8d., and his mean output of butter fat by 25.8lbs. These results are satisfactory.

Herd 1/R.—A mean output of 298.97lbs. of butterfat from 607.11galls. of milk. Mr. Apps reports on this herd as follows:—"This herd of 17 cows of Jersey and Shorthorn grades is in splendid condition. The herd sire is a Jersey."

Herd 1/E.—A mean output of 295.27lbs. of butter fat from 673.15galls. of milk. Mr. Apps reports on this herd as follows:—"This herd of 20 cows consists of grade Friesians and Jerseys; they are in splendid condition. The herd sire is Jersey.

Herd 1/M.—A mean output of 291.15lbs. of butter fat from 583.53galls. of milk. Mr. Apps reports on this herd as follows:—"This herd contains Jerseys and Jersey grades; they are in very good milking condition. The sire is a Jersey."

Herd 1/J.—A mean output of 289.74lbs. of butter fat from 643.46galls. of milk. Mr. Apps reports as follows on this herd:—"In this herd are 18 cows, representing Jersey and Shorthorn grades; they are in the best of milking condition. The herd bull is a Friesian, and it is the owner's intention to grade up his herd to Friesian blood."

Herd 1/X.—A mean output of 287.23lbs. of butter fat from 657.83galls. of milk. Mr. Apps reports as follows on this herd:—"This herd includes 18 cows, representing Jersey and Shorthorn crosses. They are in very good milking condition. The herd bull is a Shorthorn."

Herd 1/Z.—A mean output of 281.55lbs. of butter fat from 637.41galls. of milk. Mr. Apps reports as follows on this herd:—"This herd consists of 21 Jersey and Shorthorn crosses, in really first-class milking condition. The herd bull is a Jersey."

Herd 1/W.—A mean output of 280.93lbs. of butter fat from 746.63galls. of milk. Mr. Apps reports as follows on this herd:—"The 21 cows in this herd are grade Friesians and grade Jerseys. They are in first-class milking condition. The herd sire is a Friesian."

The seven remaining herds did not complete 12 months' lactation, and do not call for special comment. Attention should, however, be called to Herd 1/AA (Mr. J. J. Victory). This herd yielded 312.28lbs. of butter fat from 699.87galls. of milk in a period of 11 months. Had a twelfth month been included, the butter fat yield would probably have been in the neighborhood of 340lbs., which would have placed the herd third on the list for the year.

Changes in the Herds During the Year.

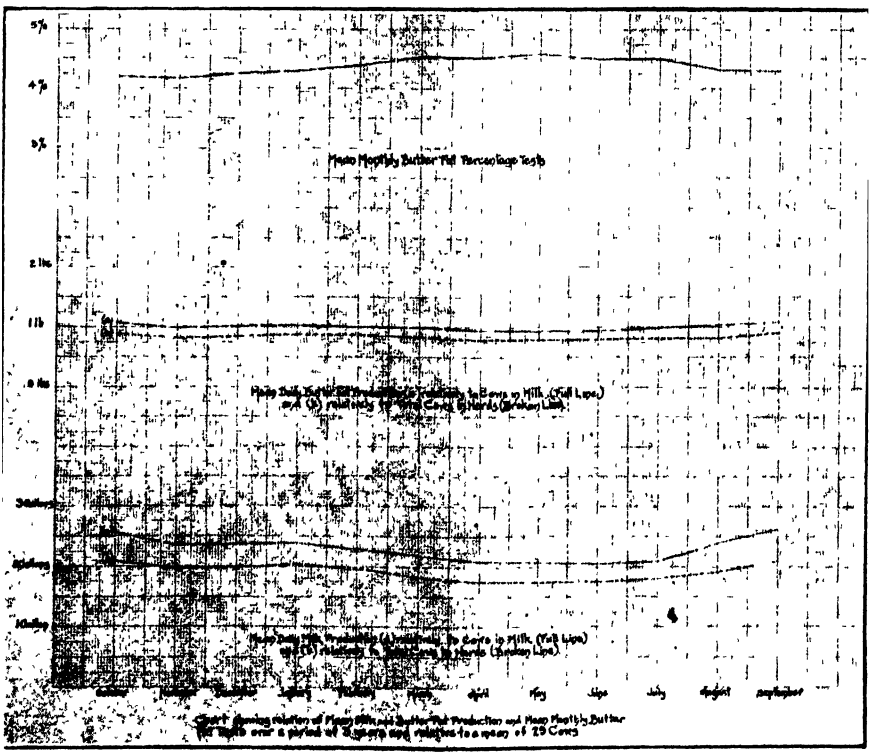
Changes affecting numbers in the herds of the Association during 1922-23 are shown on next page in contrast with those of the preceding years.

TABLE XI.—*Showing Fluctuations in Numbers During Three Years.*

	1922-23.		1921-22.		1920-21	
Opening numbers	280		287		246	
New members during year	47		—		—	
Purchases	66		35		24	
Heifers on first calf	69		41		22	
Sales		91		39		33
Deaths		7		17		2
Resignations during year		81		—		—
Totals	462	179	363	56	292	35
Less reductions	179	—	56	—	35	—
Closing numbers	283		307		257	

Relatively to the two opening years, notable features in 1922-23 were the resignation of old members and the admission of new ones during the course of the year; heavy sales of presumably unsatisfactory or old cows, and a large proportion of heifers on their first calves (over 25 per cent. of the mean number of cows present during the 12 months).

It may be noted that during the three years the mean number of cows under test per annum was represented by 289 head, and the mean number of deaths by 8.67 per annum. This represents a mean percentage of about 3 per cent.



Graphs Showing Mean (3 years) Monthly Milk, Butter Fat, and Butter Tests of River Murray Herd Testing Association.

Specially Meritorious Cows in the Association.

The River Murray Herd Testing Association is essentially an association of dairymen, whose sole income is the returns from their cows. It does not, therefore, include special breeders, who at times are tempted to make record yields their main objective, independently of the profitableness or otherwise of the latter. Nevertheless, by careful selection and treatment, members of the Association have succeeded in securing some very satisfactory records from some of their cows. I append below a summary of some specially high yields secured during three years' operations:—

Table XII.—*Showing Number of Cows Having Yielded 1,000galls. of Milk and 400lbs. of Butter Fat in the Course of a Year.*

	1922-23.	1921-22.	1920-21.
Cows having Yielded 1,000galls. of Milk and over—			
1,700galls. and over	1	—	—
1,600galls. and over	1	1	—
1,500galls. and over	1	2	1
1,400galls. and over	1	2	1
1,300galls. and over	2	4	1
1,200galls. and over	3	7	5
1,100galls. and over	4	15	8
1,000galls. and over	11	24	14
Cows having Yielded 400lbs. of Butterfat and over—			
650lbs. and over	—	1	—
600lbs. and over	1	2	—
550lbs. and over	1	3	1
500lbs. and over	1	4	2
450lbs. and over	5	9	8
400lbs. and over	10	30	16

For the most part the heavy yielding cows of 1921-22 and 1920-21 belonged to Mr. Halliday's herd, which was, unfortunately, withdrawn in 1922-23. In the latter year, however, Mr. Morris had nine cows which yielded over 1,000galls. of milk, one of which established a record for the society with 1,773galls. of milk. Similarly, in the same season, seven of Mr. Morris's cows yielded over 400lbs. of butter fat, one of them attaining 637.9lbs. In the same year, Mr. Foster had one cow which yielded over 1,000galls. of milk, and four cows over 400lbs. of butter fat. One of Mr. Cheetham's cows yielded over 1,000galls. of milk, and two of them over 400lbs. of butter fat. Similarly, two of Mr. Starr's cows yielded over 400lbs. of butter fat. Finally, in the herds of Messrs. Baldock, Paterson, Cailes, and Clark, respectively, one cow in each herd exceeded the 400lbs. of butter fat standard.

Comparative Financial Returns from Individual Herds over the Three Seasons.

I have summarised in Table XIII. the estimated financial returns from individual herds over the three years.

TABLE XIII.—*Showing Value of Production per Cow of Competing Herds over the Three Seasons.*

Herd No.	1922-23.						1921-22.						1920-21.					
	As Whole Milk.			As Butter-fat and Skim Milk.			As Whole Milk.			As Butter-fat and Skim Milk.			As Whole Milk.			As Butter-fat and Skim Milk.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1/C.....	38	2	5	30	14	9	37	8	7	30	10	2	29	16	3	24	14	5
1/U	33	3	10	28	10	4	32	8	9	29	1	1	—			—		
1/T	27	0	1	26	8	0	23	6	7	22	14	10	—			—		
1/Y	31	6	10	26	11	7	—			—			—			—		
1/L ..	29	0	2	25	19	10	25	18	3	24	3	8	26	4	5	23	15	11
1/R	25	5	11	24	4	8	19	1	10	18	5	7	—			—		
1/E . . .	28	1	0	24	9	0	27	2	3	24	6	8	26	10	3	24	15	5
1/M	24	6	3	23	10	10	22	10	7	20	16	8	19	11	2	17	14	8
1/J	26	16	3	23	17	6	25	4	5	23	2	0	28	6	10	25	8	0
1/X	27	8	2	23	16	2	—			—			—			—		
1/Z.....	26	11	2	23	5	9	—			—			—			—		
1/W .. .	31	2	2	24	0	4	—			—			—			—		
Means ..	29	7	5	25	10	9	27	15	7	24	13	11	28	6	9	24	15	9

In the above Table, whole milk has been valued at 10d. a gallon, butter fat at 1s. 4d. a lb., and skim milk at 2d. a gallon.

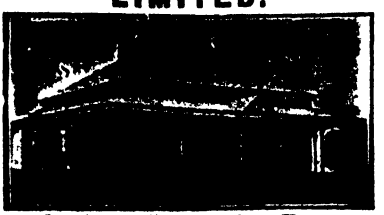
To be noted, in the first place, that notwithstanding the withdrawal of a large herd of exceptionally heavy milkers, the Association as a whole has improved the average output per cow by about £1 per cow. I have already pointed out how much greater this improvement actually is if account be taken of Mr. Halliday's herd. On the other hand, Herd 1/C (Mr. C. J. Morris) has improved the mean output per cow by £6 0s. 4d. to £8 6s. 2d., according as milk is sold as whole milk or as cream. Other examples of very satisfactory progress are those of Herd 1/R, showing an improvement of £5 19s. 1d. to £6 4s. 1d. per cow, and Herd 1/M, showing an improvement of £4 15s. 1d. to £5 16s. 2d. per cow.

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DOWNY MILDEW

(*Plasmopara Viticola*).

[By D. G. QUINN, Viticultural Instructor.]

Although this well-known mildew was dreaded by Australian vignerons long before it visited our shores, it has now been with us some years; but, so far, it has not in South Australia exhibited its ability to spread and devastate our viticultural areas. However, it would be a great mistake for the vinegrowers of this State to treat downy mildew with contempt, simply because it has failed to give us a demonstration of its powers in the past.

Minor outbreaks have been observed each year since the introduction of the disease, such as, for example, that in the Marion district about this time last year. In the past we have had to thank the dry, hot weather conditions which followed the outbreaks or late appearance of the fungus for checking the general spread of the disease. We cannot, however, always trust to the weather, for sooner or later it will fail us, in which case those not fully conversant with the disease, and the controlling measures necessary, must be prepared to suffer severely.

Many admirable papers treating with this trouble have been published in the past; but it is possible that many of them have not come under the notice of some of the vignerons who read the *Agricultural Journal;* hence, to fill this gap, the following article has been drawn up. Furthermore, it appears that the characteristics and the correct manufacture of the chief sprays advised are not wholly understood by all and special attention has been devoted to this phase of the subject.

These articles have given a full historical review of the spread of the disease throughout the vinegrowing areas of the world, a description of the disease, and the recognised mode of combating it, so these are but briefly touched on herein.

HISTORICAL REVIEW.

This disease was accidentally introduced into Europe from North America in 1879 and since that date it has proved itself to be the most disastrous of all the fungoid pests which attack the vine. In humid climates the treatment of this disease has proved to be very laborious and costly, but in South Australia, with the aid of our hot, dry summer, we hope to be able to control it with far fewer sprayings than would be deemed sufficient in many of the other vine growing countries of the world.

The first outbreak of the disease in Australia occurred in January, 1917 at Rutherglen in North-eastern Victoria, and in the following year the season proving favorable to it, 90 per cent. of the normal crop of the district was lost. Since its introduction to Australia the disease has spread rapidly. In 1918 the Yanco, Mirrool, and Hunter River districts of New South Wales were infected, and in 1921 it was reported at Mildura, Renmark, Watervale, Langhorne's Creek,

and Angaston, and last year a slight outbreak occurred in the Marion district near Adelaide. The fungus has not yet been recorded in Western Australia.

Description of the Disease.

This disease only attacks the herbaceous parts of the vine. It appears first on the upper surface of the leaf as a discolored irregular patch of a slightly paler hue than the remainder of the leaf, and with the advent of moist conditions, the under surface of the patch becomes covered with a dense white downy substance. This is rarely seen on the upper surface of the leaves and not often on the shoots or flowers. It is, however, not unusual to see the fungus attacking the fruit. If the berries are attacked early in the season, the flesh presents a greyish white appearance and later dries up; this form has been termed



Fig. 1.—Grey Rot or Bunch Mildew. Diseased vines shoot in early spring—lower bunch covered with characteristic white down, which is also visible on upper half of stem, the twisting of which is due to fungus action. Reproduced from *Le Mildiou* by L. Ravaz.

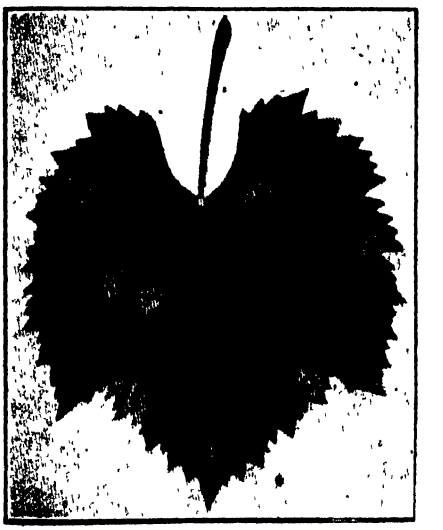


Fig. 2.—Oil spots on upper side of leaf; corresponding with these on the under side, the white down develops in moist weather. (After Ravaz).

"Grey Rot". If, on the other hand, the attack occurs when the fruit is farther advanced, the berries first become more or less discolored, finally assuming a dull red color, soften, and fail to ripen. This form has been termed "Brown Rot". The crop may be attacked in this way right up to the turning of the berries, and, failing proper treatment, a few days will suffice to spoil the whole of the year's production.

The leaves are most subject to the attack, but even in a mild case the crop suffers indirectly owing to the functions of the leaves being disordered, the fruit yielding juice of lower quality, and in smaller

quantities than normal. During a serious visitation of the disease the whole of the foliage may fall so that not only will the current season's crop be ruined, but that of the following season will be seriously compromised because the premature fall of the leaves prevents the accumulation of those reserve substances in the tissues of the plant which are so necessary to give the vine a healthy start in the following spring. If this is allowed to happen several years in succession, many of the vines will be lost, in fact when the disease first appeared in Europe, whole vineyards were wiped out before a means was discovered to retard it.

Life History of the Fungus.

Downy mildew is an endophytic fungus and is therefore somewhat difficult to deal with. It produces its summer spores (conidia) at the ends of long columns (conidiophores) which issue from the stomata of the leaves on the under surface. Under favorable conditions these spores are produced with extreme rapidity. They fall upon the upper surface of other leaves or are carried by the wind to set up new centres of infection. There is one peculiarity about the spores of downy mildew and that is they must be immersed in free moisture for some time before they will germinate and then they do not germinate like the spores of most other fungi by simply throwing out a penetrating tube, but by subdivision into zoospores. These zoospores are delicate oval bodies provided with "cilia" or vibrating appendages which enable them to move about in a film of water. These zoospores then swim about, and when one comes upon a breathing pore of a vine leaf or fruit, as the case may be, it throws out a germ tube which passes *via* the stoma into the internal tissues of the plant. From now on the fungus develops internally and cannot be reached by any spray which does not destroy the leaf. The only time when the fungus is assailable is when the delicate zoospores are swimming about in the film of moisture on the leaves or fruit of the plant. Once the leaf has been infected, the germ tube ramifies into what is known as the mycelium and within about seven days the development of the fungus causes the appearance of the characteristic pale spot, somewhat resembling the effect produced by a drop of oil on green paper.

This "oil spot" now remains latent until the presence of moisture is felt and then a fresh generation of spores is immediately thrown out. This occurrence may be noted with the naked eye, the spores massed together appearing like a pinch of glistening salt hanging to the under side of the "oil spot."* It is in this manner that the disease multiplies and spreads through the summer months.

Before passing on it might be well to emphasize the fact that the "oil spot" stage is the critical period because with the coming of a rain the fungus will throw out enormous numbers of summer spores which will contaminate fresh centres. On the other hand if the season remains dry the diseased spot will dry up and fall out or the infected leaf may drop off leaving the leafstalk attached to the cane.

* If a pale patch is noted upon a leaf, and corresponds to the description of an "oil spot," the presence of the fungus may be proved by enclosing the leaf in damp blotting paper and storing it in a warm room. If such is a true "oil spot" the characteristic white efflorescence will appear after the lapse of 12-24 hours.

Towards the end of the summer, the fungus inducing mildew gives rise to "Oospores" or winter spores. These are produced within the tissues of the leaf and they are simply thick walled cells containing numerous zoospores. Oospores can pass through the winter without injury and it is said they can even pass through the digestive organs of sheep without injury.

With the fall of the leaves and their subsequent decay, the winter spores are scattered all over the soil of the vineyard, and they lie dormant until the warm damp weather of mid-spring causes them to burst into life, the zoospores being splashed or blown on to the foliage and thus the life cycle is repeated once again.

The disease only spreads appreciably when the conditions of heat and moisture combined make the season favorable. Bourcart states that the oospores take more than a day to germinate when bathed in water at a temperature of 52deg. Fahr. and so it follows that it is only during warm yet very wet weather that the disease is to be feared. These conditions are somewhat rare during early spring, but they are frequently experienced during the middle of October.

The disease is therefore somewhat irregular in its appearance, but after the infection has once taken place, if several heavy rains are experienced at intervals of seven to fourteen days during the warm weather of late spring, the disease will cause much consternation among owners of infected but unsprayed vineyards. On the other hand the South Australian summer is generally hot and dry and unfavorable to fungoid life, but periodically a wet summer is experienced and when such is the case this disease will have to be watched for and treated intelligently, as it is capable of spreading much more rapidly than any of the other fungus diseases we have had to deal with in the past.

Strong winds, either hot or cold, check the spread of the disease and so exposed vineyards are much less subject to it than sheltered ones.

According to experience gained in Victoria and New South Wales not any of the varieties grown there appear to be immune from attack, and another interesting point is that the tractor sprayer gives better results in trellised vineyards than where the vines are pruned on the "gooseberry" bush system.

Treatment.

It is impossible to reach the winter spores because they lie scattered all over the ground where the diseased leaves of the previous summer have decayed, and it is also impossible to reach the fungus once the vines are infected, owing to the fact that the fungus is an endophyte. The treatment therefore can only be a preventive one, and it aims at destroying the zoospores before they enter the herbaceous portions of the plant. These spores are very sensitive to the soluble salts of copper, very dilute solutions of which are sufficient to bring about their destruction.

Any substance applied to the leaves as a spray, to be of any value, must only be slightly soluble, so that the first shower of rain does not wash it off, and yet sufficiently soluble for a rain or dew drop to be able

to dissolve a trace of copper. The compound must maintain its properties when exposed to the air, and it must also be sufficiently adhesive to remain on the leaves after drying.

The soluble salts of copper are the most powerful fungicides known. Pure copper sulphate is too soluble, for it not only washes off easily but is absorbed by the leaves and causes their destruction.

The preparation known as Bordeaux Mixture gives the best results and it may be interesting to mention that this compound, which has since proved to be the most valuable fungicide known, was discovered by chance in this manner. To prevent marauders from gathering the ripe grapes on the vines adjacent to the roads it was customary, long before the appearance of mildew, in the different communes of Bordeaux and Burgundy to spray the grapes with milk of lime, to which was added a little blue vitriol to color it. As far back as 1882 it was found that these borders were less subject to mildew than the remainder of the vineyard. This empirical remedy was thus recommended to combat the mildew under the name of Bordeaux mixture. In the early days 15 per cent. of lime and 8 per cent. of bluestone was used and this was spread by means of small heather brooms.

From year to year the strength of the spray was reduced owing to the results of experiments which showed that two and even one per cent. solution of blue vitriol accompanied by sufficient lime to neutralize it were just as efficacious as the stronger solutions, and to-day these strengths are accepted as the best.

The copper hydrate is the active substance in Bordeaux mixture and it is prepared by precipitating a soluble salt of copper by an alkali thus:—

$CuSO_4$	+	$Ca(OH)_2$	=	$Cu(OH)_2$	+	$CaSO_4$
Copper Sulphate.		Slaked Lime.		Copper Hydrate.		Calcium Sulphate.

The copper hydrate may slowly change to copper carbonate but as such it is just as effective as in the former state.

Both these substances are almost insoluble in water, but are slightly soluble in water charged with weak acids, e.g. (H_2CO_3, &c.). The amount rendered soluble in practice on a wet leaf is always so small that the plant is never in contact with a poisonous amount of a soluble copper salt, but the infinitesimal quantities present not only suffice to preserve the plant from the invasion of injurious fungi, but also it is stated, stimulates the vitality of the foliage treated.

The sulphate of lime, on the other hand, has no beneficial action, but the presence of an excess of lime not only reduces the adherence of the spray, but reduces the fungicidal value of the copper hydrate also.

PREPARATION OF BORDEAUX MIXTURE.

Two solutions are prepared, one of blue vitriol (bluestone), the other milk of lime. The blue vitriol should be as pure as possible and should be dissolved in wooden, copper, glass or stoneware vessels. Those of tin or iron should be avoided as these metals decompose it.

To facilitate the solution of this salt, it is placed in a bag suspended just below the surface of a vessel filled with rainwater. If one should

be pressed for time, it may be dissolved in warm water, which must be cooled before use to obtain the fine gelatinous precipitate desired. The lime used should be good freshly burnt and lumpy quicklime, and this is slaked by adding water gradually, after which the milk of lime is stirred and carefully strained through a fine sieve.

To obtain a fine gelatinous precipitate, having a maximum adherence to the leaves, it is advisable to run these two solutions simultaneously and slowly into the spray tank, stirring continuously. (The next best mixture is made by running the milk of lime into the spray tank containing the dilute copper sulphate solution.)

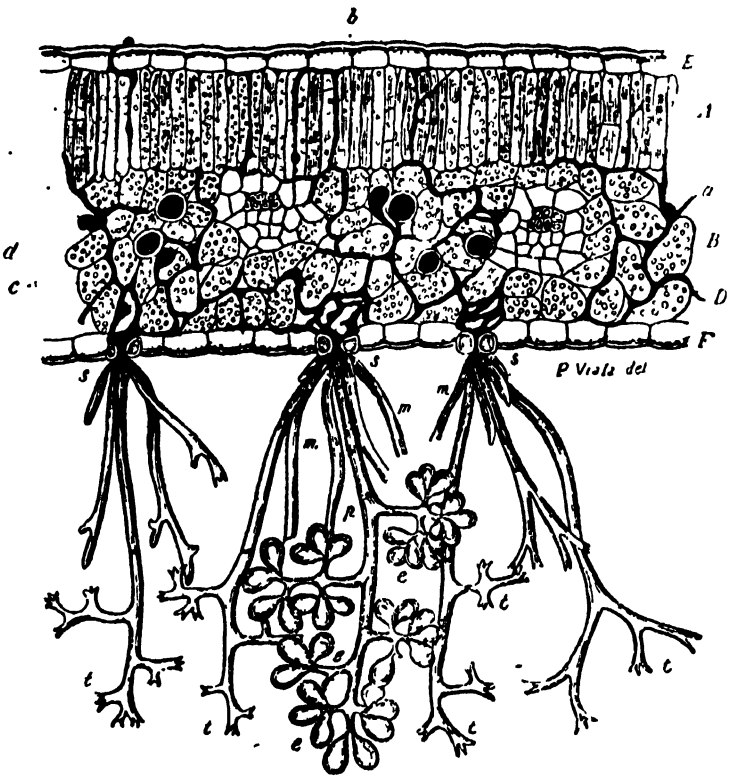


FIG. 1.—**Downy Mildew**—*Plasmopara viticola.* B. and de T.

Diagrammatic section of a vine leaf infested with Downy Mildew, showing how the mycelium of the fungus (*a*) circulates between the cells which constitute the normal tissue of the leaf. At *s*, *s*, *s* are three stomata or breathing pores, through which the conidiophores or spore-bearing filaments emerge. It is these which constitute the characteristic white down on the under side of the leaves. Conidia, or summer spores (*c*) are, however, only shown on one filament. The round black bodies with white rim, in the interior of the leaf, are oospores.—(After Viala.)

[Reprinted from the *Journal of the Department of Agriculture of Victoria.*]

When dealing with pure chemicals 14lbs. of quicklime suffice to precipitate 62½lbs. of bluestone, but in practice the amount of lime used is always greater because the lime is never pure. The amount of lime therefore varies according to its purity from 1lb. to 3lbs. of lime to every 3lbs. of copper sulphate. Litmus or Phenolphthalein paper may be used to indicate when sufficient milk of lime has been added to precipitate the copper solution.

The mixture known as the one per cent. solution contains 10lbs. of blue vitriol and 3½lbs. to 10lbs. of quicklime per 100 gallons of water. In wet seasons a two per cent. solution is advisable, but in normal seasons the formula common amongst our fruit growers, viz. 6lbs. copper sulphate, 4lbs. quicklime to 50 gallons of water, may be relied upon to give satisfaction. Five ounces of casein or a quarter of a pound of soap per 50 gallons may be added to increase the spreading power of the spray, the former being dissolved in a 10 per cent. solution of washing soda.

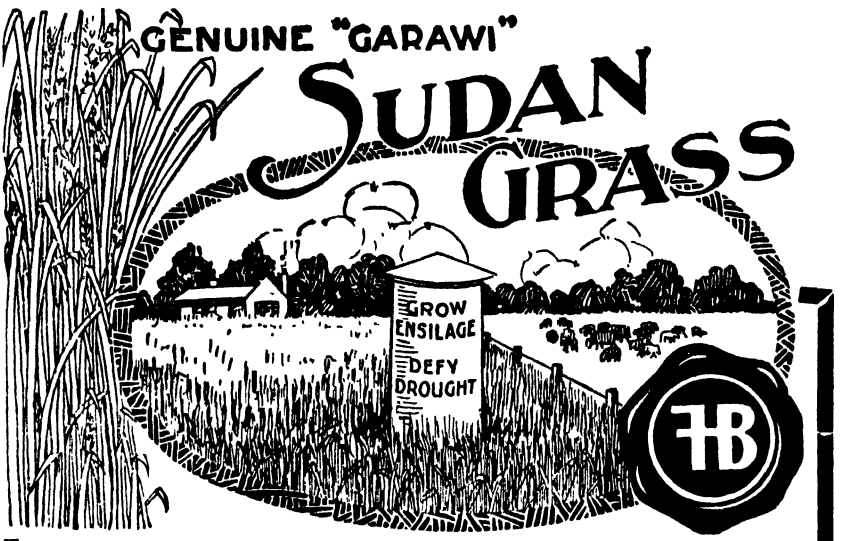
The mixture should be just alkaline which may be shown by the fact that phenolphthalein paper turns pink on immersion, red litmus blue, or if a bright wire nail be immersed for several minutes no copper should be deposited on its surface. If allowed to stand the bluish copper hydrate should settle and the liquid above should be absolutely colorless, a blue tint showing the presence of unchanged copper sulphate. The mixture must respond to all these tests otherwise it is unfit for all the purposes for which it is intended.

The mixture is the more adherent, the more nearly neutral it is, and also it must not be allowed to stand long before use. Continual agitation is necessary during its application, because the active substance, the copper hydrate, is not in solution, but simply in suspension.

Referring to the effect of this spray on the summer spores of mildew, Boucart states "If the water necessary for the development of the spore contains the minimum amount of copper the conidium does not germinate, or if it germinates the germinating tube cannot penetrate into the leaf. The object of the Bordeaux spray is thus to prevent the conidia from forming new hotbeds of infection by stopping their evolution. Against mildew one per cent. mixtures have always proved quite as efficient as the generally recommended two per cent. mixtures and it has been found better to renew the thin copper deposit on the leaves frequently than to spread a thick layer on them several times a year, as these organs are continually growing and being washed by rains. The great point is to cover all the surface of the vine uniformly by copious and careful sprayings with Bordeaux mixture."

TIME TO SPRAY.

The spraying, being essentially a preventive treatment, must precede the infection of the plant, for once the fungus has penetrated the tissues, any fungicide is powerless so far as that particular invasion is concerned.



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The warm wet weather experienced in spring causes the germination of the oospores, and Victorian experience has shown that the first spraying should be applied shortly before the middle of October when the young shoots have reached a length ranging between six inches and ten inches.

The second spraying should be applied shortly after the flowering of the vines or three to four weeks after the first spraying; this will serve to protect the young fruit bunches and the growth produced since the first spraying from infection. In some instances it may be deemed advisable to apply a third treatment about a month after the second spraying.

If the weather conditions during any part of the growing period appear to be unusually conducive to the spread of the fungus, additional sprayings may be applied with advantage, if the object is to renew former coats of spray which have been subjected to heavy rains, or to cover growth which has appeared since the previous spraying.

As to the application of the sprays, little need be said except that fast two wheeled tractor sprays will shortly be looked upon as one of the essential implements of a vineyard—one being allowed for each 100 acres under vines. For very hilly or closely planted country which does not permit the use of wheeled vehicles, simple outfits are available, which are worked by compressed air and attached to the pack-saddle of a horse.

A SUGGESTION FOR THE MANUFACTURE OF BORDEAUX MIXTURE IN LARGE QUANTITIES.

Near the water supply place an old hogshead or puncheon from which the head has been removed, and, the evening prior to the day of spraying, set sufficient bluestone for the day's work to dissolve, adding one gallon of water for each pound of bluestone. On the following day, if using the 6-4-50 mixture, as a spray-cart draws up (capacity 50 gallons) add 40 gallons of water to the tank then with the aid of a measure add six gallons of the bluestone solution. Slake the lime in the following manner:—

Put the required weight in a bucket and add a pint of water. When absorbed add another pint, and so on until the lime will take up no more water, when the bucket may be filled and stirred freely. Lime generally contains a varying quantity of gritty impurities, hence it is necessary to strain the milk of lime through a fine gauze, the mesh not exceeding the diameter of the outlet in the spray nozzles. The diluted lime water is then vigorously stirred into the spray tank, making the total liquid up to the 50galls. mark. It is then applied to the vines within an hour or two.

It has been previously pointed out that a considerable excess of slaked lime is undesirable, hence if the owner ascertained, by the use of an indicator such as litmus paper, the quantity of local lime necessary to precipitate the quantity of bluestone he is using, on the first spray-cart sent out, the same quantity could be added to each

of the following refills whilst the lime in hand lasts, provided the period does not exceed 8 to 10 days. Sixpence-worth of litmus paper would be more than sufficient for the season, and can be obtained from all commercial chemists.

At each spraying fresh lime should be obtained from the kiln, although on a small scale it can be preserved in airtight tins.

EFFECT OF SPRAYS ON THE RESULTING WINE.

With reference to the effect of late sprayings on the wine eventually produced, Millardet, Guyon, and numerous other chemists and hygienists have shown that copper salts sprayed on the grapes are conveyed in a very small amount into the fermenting vat and are almost totally eliminated in the lees shortly after the fermentation of the must has been completed.

BURGUNDY MIXTURE.

Another compound possessing the same fungicidal value as Bordeaux mixture has been termed the copper-soda or Burgundy mixture.

For certain purposes this mixture possesses several distinct advantages over the former, and these may be summed up as follows:—

1. The chemicals necessary may be stored indefinitely without fear of deterioration.

2 No trouble arises from the blockage of the spraying nozzles. (In the case of Bordeaux mixture, constant trouble is here experienced if the milk of lime is not strained very effectively.)

3. The fungicidal and adhesive qualities of correctly prepared Burgundy mixture are quite equal to those of Bordeaux mixture.

The Burgundy mixture has long been the favorite fungicide amongst our orchardists for combating the shothole of the apricot (*Clasterosporium carpophilum*), the peach curl leaf (*Exoascus deformans*), and the black spot or scab of the pome fruits (*Fusicladiums*), during the early spring; but experience has shown that the spray, when applied later in the season, frequently burns the foliage rather badly, even when the correct mixture, namely, 6lbs. of bluestone, 11-11½lbs. of washing soda per 50galls. of water, is used.

Spencer Pickering states that the cause of the damage is mainly due to the bi-products—baking soda and sulphate of soda—which invariably occur, as the following equation will show:—

$$\underset{\text{Copper Sulphate.}}{5CuSo_4} + \underset{\text{Washing Soda.}}{8Na_2CO_3} + \underset{\text{Water.}}{3H_2O} = \underset{\text{Basic Copper Carbonate.}}{5CuO, 2CO_2} + \underset{\text{Baking Soda.}}{6NaHCO_3} + \underset{\text{Sulphate of Soda.}}{5Na_2SO_4}$$

Furthermore, if any error occurs, either in the weighing or the composition of the original ingredients (bluestone or washing soda), it will lead to the presence of an excess of one or the other, and thus increase the "burning" effect.

For these reasons, we advise that Bordeaux mixture be preferred to Burgundy mixture for combating mildew, and, in fact, for protecting any plant in leaf against endophytic fungi. With the former spray,

provided that it is properly made and slightly alkaline, the vigneron can rest assured that he is using the most effective fungicide available, and no matter at what concentration it is applied, no burning will occur.

If an excess of lime water has been added, it does not damage the foliage, but merely reduces the fungicidal value and the adhesive qualities of the mixture.*

It is not my intention here to mention Eau Celeste—a useful spray, but in no way superior to Bordeaux mixture.

DUST SPRAYS.

A great number of these mixtures have been advocated. Most of them contain blue vitriol mixed with inert powdered substances, and sometimes sulphur is added to render them effective against oidium also. In general the adherence of these compounds is not equal to the "liquid sprays," and many of them are carried off by the first wind or rain—often scorching the foilage at the same time. They possess no outstanding quality which warrants advising their use.

COMMERCIAL SUBSTITUTES FOR BORDEAUX MIXTURE.

In the hands of a novice, some of these preparations, which before use simply need the addition of water, may give satisfaction, and when only a few gallons of spray are required they may save much time and trouble; but when working on a commercial scale, nothing will prove more efficient, adherent, and less costly than Bordeaux mixture, correctly made on the spot by a man who understands the operation.

I cannot close this brief article without recommending the reader who desires to make a more detailed study of this fungus to turn to Mr. Francois de Castella's excellent article, which he published in the *Victorian Journal of Agriculture* some years ago, and will conclude by repeating his final words of advice:—

"Forewarned is forearmed: to ignore this menace is courting disaster. Though visitations such as would necessitate the almost weekly sprayings sometimes needed in France are not to be feared here, the disease may do harm in a wet summer. That spray protection will prove much more efficient here than in France can confidently be promised. It is hoped, therefore, that growers will familiarise themselves with the usual methods of treatment outlined above, keep a sharp look out for the first appearance of the disease, and, above all, make arrangements to secure without delay, should occasion arise, the necessary outfit and materials."

*The above statement is accounted for in the following manner. The lime water $Ca(OH)_2$ in contact with the atmosphere changes to limestone ($CaCO_3$); some of it drops off the foliage, carrying with it other portions of the solidified spray. Whilst this change is going on, the fungicidal value of the mixture is reduced owing to the acid gases produced by the leaf going towards the neutralisation of the lime salt, instead of rendering minute quantities of the copper salt soluble. This change, fortunately, is completed fairly rapidly.

NARACOORTE AND KYBYBOLITE BRANCHES OF THE AGRICULTURAL BUREAU.

EIGHTH ANNUAL FARM COMPETITIONS.

Conducted under the following Committee of Management:—Messrs. S. H. Schinckel, F. A. Holmes, J. Donoghue, J. M. Wray, A. B. Feuerheerdt, E. S. Alcock (Naracoorte Branch), L. S. Davie (Chairman), A. Bradley, S. Shepherd, H. B. Schinckel, and L. J. Cook (Hon. Secretary) (Kybybolite Branch).

[By W. J. Spafford, Superintendent of Experimental Work.]

For the eighth consecutive year a committee composed of members of the Naracoorte and Kybybolite Branches of the Agricultural Bureau has conducted farm competitions for residents of the two districts, and, with the exception of the classes for the best worked and managed farms, these competitions have created a great deal of interest, and have been fairly well supported.

CONDITIONS.

The following conditions were laid down to govern the competitions:—

1. The competitions shall be open to all persons farming or residing within the radius of the boundaries of the District Council of Naracoorte.

2. Entries in writing, and accompanied by necessary fee, must be lodged with the Hon. Secretary of Farm Competitions, Kybybolite, not later than the Saturday following the Naracoorte P. & A. Society's 1923 Show, for all classes except Nos. 1 and 7, entries for which close on September 1st, 1923.

3. All entries to be made in the name or names of the *bona fide* owners of the property entered for competition.

4. The judging will take place about the middle of November, 1923, for all classes excepting sheep, which will be judged in the wool, as soon as possible after the entries close, and the decision of the judges shall be final.

5. Competitors will be required to accompany the judges, and, if necessary, also drive them round the property entered for competition, and also to answer any questions bearing upon the same, which may be put to them by the judge.

6. Where share farmers compete the person who does the work receives the prize.

7. No third prize will be allotted unless four entries are received for a class, and no second prize will be allotted unless three entries are received.

Class I.—Best Worked and Managed Farm.

First prize, cup or trophy, valued £10 10s. (including £5 5s. presented by L. DeGaris, Esq.), to be competed for and won three times by the same competitor, each winner's name to be engraved on the trophy. Second prize, £3 3s. (presented by Cresco Fertilizers, Limited). Third prize, £1 1s. Yearly entrance, 5s.

The judging for the best worked and managed farm will be done by the point system, from a commercial point of view, and to the following standard:—

1. System of cropping, including cultivation, rotations, manures, growing crops, summer crops, and fallow	100
2. Most profitable class of stock on farm, advantage being given to breeders (horses, sheep, cattle, pigs, and poultry)	100
3. Implements and machinery suitable for the farm	40
4. The general care of implements, harness, and farm equipment	25
5. System of boundary and divisional fencing, including gates, sheep, horse, and cattle yards	40
6. System for conveying surplus surface water from the farm land	15
7. The provisions for fodders	40
8. Watering stock and water supply	40
9. Time and labor saving appliances and methods	10
10. Arrangements of dwellings and outbuildings	25
11. Plan and upkeep of orchard, vegetable, and flower gardens, and other plantings for beautifying the homestead	20
12. Afforestation or shelter breaks	30
13. Experimental work of any kind conducted	15
14. Discretionary points allowed by judge	50
Total	550

No entries received this year.

Class 11.—Most Improved Area of Pasture.

First prize, half a ton ground rock phosphate (presented by Arthur H. Hassell, Esq.). Second prize, £1 1s. (presented by S. Shepherd, Esq.). Third prize, 10s. 6d. (presented by F. A. Holmes, Esq.). Entrance fee, 2s. 6d.

The difficulty of judging the entries in this competition is to place a correct value on the improvement made on the "natural pasture," because the soil types of the district vary between fairly wide limits, but the following scale of points answers the purpose fairly well:—

1. *Quantity of feed in pasture* will always be of the greatest importance, and so 35 per cent. of the marks were allowed for this.

2. *Type of plants present* is of consequence, because although many plants are eaten by livestock, some are of much higher feeding value than are others, and so 15 per cent. of the marks are allotted here.

3. *Quality of feed* has much to do with the value of any pasture, for luxuriant, over-rank plants have much lower palatability and feeding value than smaller plants of the same kind, and the presence of certain plants lowers the feeding value of other more useful kinds, so 10 per cent. of the marks are used for this.

4 and 5. *Freedom from useless plants and general care of pasture* have each been allotted 5 per cent. of the total marks.

6. *Improvement to natural pasture* is very difficult to arrive at, because (*a*) some types of soil exist in comparatively small patches surrounded by large areas of a very different kind of soil; (*b*) all fields of some farms have been cultivated and cropped with dressings of fertilisers for long periods of time, with the inevitable destruction of all "natural pastures" for comparison purposes, but for the purpose 25 per cent. of the marks were allowed.

7. *Area of pasture submitted* has been allotted 5 per cent. of the marks, because it is more creditable, and at the same time more difficult, to improve a large area than a small one.

The nine pastures submitted for judging have been given the following points:—

Name and Address.	Quantity of Feed	Type of Plants	Quality of Feed.	Freedom from useless Plants.	General Care.	Improvement to Natural Pasture.	Area of Block.	Total.
	35	15	10	5	5	25	5	100
E. C. H. Schinckel, Kybybolite	32	13	9	4	5	20	3	86
S. Shepherd, Kybybolite	27	12	8	4	4	20	3	78
S. Shepherd, Kybybolite	22	11	8	4	4	18	5	72
J. M. Wray, Hynam	28	8	6	4	4	17	1	68
E. C. H. Schinckel, Kybybolite	21	10	7	3	3	19	4	67
H. B. Schinckel, Kybybolite	23	8	7	4	4	18	2	66
E. C. H. Schinckel, Kybybolite	20	9	7	3	3	19	4	65
J. M. Wray, Hynam	18	9	6	3	3	21	4	64
E. C. H. Schinckel, Kybybolite	19	9	6	3	3	18	2	60

The Pastures Exhibited in Class II.

1. *Mr. E. C. H. Schinckel* (10 acres).—This field was seeded with subterranean clover in 1920 at the rate of 1lb. seed per acre with 1cwt. superphosphate (36 per cent.). In 1921 it received a dressing of 1cwt. superphosphate (36 per cent.) per acre; a 1cwt. dressing per acre of 45 per cent. superphosphate in 1922; and 187lbs. of 45 per cent. superphosphate per acre this year, and at the time of judging was a dense mass of growth about 1ft. to 15in. high. There was little to be seen in the block except healthy and luxuriant subterranean clover, but the few weak patches showed a little silver grass, cape weed, sorrel, and brome grass. A first-class pasture, well cared for in the matters of fertiliser and the absence of obnoxious plants, and on the whole a great credit to Mr. Schinckel.

2. *Mr. S. Shepherd* (11 acres).—Subterranean clover was seeded in this field in 1917, and the pasture has been manured at various times since then, and this year received a dressing of 1cwt. superphosphate per acre. The whole block is very well covered with subterranean clover, and at the time of inspection this fodder averaged about 9in. in height; on one portion of the field, which had received more phosphatic fertiliser than the bulk of the land, the clover was a full 12in. high, and very thick and dense. Quite an appreciable amount of sorrel was in evidence, and some hop clover, brome grass, and hair grass. A very good pasture field, which should further improve next year if a liberal application of superphosphate is given in the autumn.

3. *Mr. S. Shepherd* (67 acres).—This field of Mr. Shepherd's is also well covered with subterranean clover, but does not carry such

luxuriant growth as the smaller one already dealt with. Other than the subterranean clover, the plants sufficiently plentiful to be readily noticed were cape weed, hop clover, brome grass, hair grass, and some sorrel. This field will show still further improvement by the clover growth becoming more regular after more phosphates have been applied.

4. *Mr. J. M. Wray* (2½ acres).—This field received a dressing of lime in 1918, at the rate of 16½cwts. per acre; in 1922 a little Wimmera rye grass seed was scattered over the land, and this year 150lbs. superphosphate was distributed to the acre. At the time of judging very little rye grass was to be seen, but the whole field carried a dense mass of cluster clover, hop clover, and brome grass, with just a sprinkling of subterranean clover, the growth averaging over the whole field, about 1ft. in height. Although the main plants present are not of such high feeding value as is subterranean clover, they are far from poor fodders when their growth has been encouraged by applications of phosphates and lime, and the plot was almost free of useless plants, with the exception of some slender thistles. This is a block of land rather better than most of the areas submitted in this class, and so fewer points were given for "improvement," but it is an extremely good pasture of naturalised fodder plants.

5. *Mr. E. C. H. Schinckel* (45 acres).—This field was cropped with a cereal in 1920 with 1cwt. superphosphate per acre, and at the same time 1lb. of subterranean clover seed was distributed to the acre. This year an application of 1cwt. superphosphate (45 per cent.) to the acre was given to the whole field after the land had been ploughed up. Although the subterranean clover was a bit patchy, on the whole it was very fair, and in many places had made quite strong growth. Where the clover was thin or absent quite a lot of water grass (juncus), sorrel, and silver grass was present, all of which are very poor fodders. This field will be much improved by heavily harrowing the land in March or early April to spread the clover seed on to the unoccupied patches, and by again dressing it with phosphate at about this time.

6. *Mr. H. B. Schinckel* (4 acres).—In 1921 this field, which had not been seeded with any pasture plants, was dressed with 90lbs. superphosphate per acre, and in 1923 received a further application of 1cwt. superphosphate per acre. At the time of inspection the pasture consisted of a fairly thick mass of wild oats, wallaby grass, hop clover, cluster clover, and woolly clover, and averaged about 6in. high. Although these fodder plants are not wonderfully good ones, except of course the wallaby grass, they are all very useful fodders, and there were few useless plants to be seen in the field. The land of which the block is composed is comparatively good, and should grow quite a number of the European fodders really well with much advantage to the owner.

7. *Mr. E. C. H. Schinckel* (32 acres).—A cereal crop was sown on this field in 1921 with 1cwt. superphosphate (36 per cent.) per acre, and at the same time ½lb. of subterranean clover seed was distributed to

the acre, and in 1923 1cwt. superphosphate (45 per cent.) was applied to the acre. The subterranean clover in this block was rather patchy at the time of judging, and as well as quite a fair quantity of the ordinary weeds of the district, there was a lot of plants of a small white daisy, and being a "wet" field, much water grass (juncus). This pasture shows very clearly the value of phosphatic fertilisers for improving the growth of plants in the Kybybolite district, because of the fact that at the time of distributing the 1cwt. dressing of superphosphate many patches of land were too boggy for horses to walk on, and on these patches no phosphate was applied, with the result that very few useful fodders grew on them, whereas everywhere the superphosphate was put, a fairly luxuriant growth of subterranean clover, cluster clover, or hop clover was produced.

8. *Mr. J. M. Wray* (40 acres).—This block was seeded with 1lb. of subterranean clover per acre in May, 1920, and was dressed with 150lbs. of superphosphate (45 per cent.) per acre in 1923. At the time of inspection this plot showed evidences of having carried many livestock, yet quite half of the land was well covered with healthy and strong plants of subterranean clover, the remainder being rather thinly covered with poor plants of brome grass, hop clover, and woolly clover. The very poor soil of this field produced little grazing before being seeded down and manured, and the improvement wrought has been very great. This will be still further improved if the land is well harrowed in the autumn, before the first rain, to spread the clover seed over the patches not yet covered, and also receives a further application of superphosphate.

9. *Mr. E. C. H. Schinckel* (8 acres).—This field has not been seeded with pasture plants, but a portion of it was dressed with farmyard manure, and in June, 1923, the whole block received a dressing of 1cwt. superphosphate (45 per cent.) per acre. When the farmyard manure was added, it carried seeds of subterranean clover, and so started this fodder on the field, and at the time of judging, this portion was very well covered with clover, despite the fact that the field had been heavily stocked during the year. The remainder of the block contained much sorrel and bartsia, and some cape weed, silver grass, and hop clover.

Class III.—Best Growing Crop of Wheat.

East of Naracoorte Range. Area at least one-fifth of total area of wheat sown on the farm, but not less than 25 acres. First prize, 1 ton agricultural lime (presented by Messrs. A. James & Son). Also, first and second prizes, certificates. Entrance fee, 2s. 6d.

From a farmer's point of view, the main consideration in wheat-growing is to produce crops returning the greatest amount of grain per acre, and to get the full market price for the grain when harvested, and in judging wheat crops these requirements must have first place. On this plan the apparent yield will be the most important subdivision, and must carry the most of the points to be allotted, and, as diseases are the main cause of decreased prices, freedom from them will be next in order of importance, and added to these subdivisions must be others showing trueness to type and freedom from weeds.

The three crops submitted for judging have been given the following points:—

Name and Address.	Variety	Apparent Yield.	Freedom from Disease.	Trueness to Type.	Freedom from Weeds.	Total
		60	20	10	10	100
C. W. Bray, Naracoorte	Federation	46	16	9	8	79
Kidman & Garnett, Laurie Park ..	Federation	40	18	9	7	74
Kidman & Garnett, Laurie Park ..	Federation	34	18	9	8	69

THE CROPS EXHIBITED IN CLASS III.

1. *Mr. C. W. Bray* (Federation).—This crop was rather irregular, some portions being really good, whilst others were quite light, these variations being caused by the excessive wetness of the season, and the presence of "take-all" further increased the patchiness. Of other diseases "loose smut" was the only one much in evidence. Although the crop was fairly free from weeds, juncus, silver grass, hop clover, and cape weed were noticeable.

2. *Messrs. Kidman & Garnett* (Federation).—This crop, grown on fallow, was thin and patchy, with good growth on the rises. Although free from bad diseases, it was far from clean, showing a lot of water grass (juncus) and thistles, and some of most of the ordinary weeds of the district.

3. *Messrs. Kidman & Garnett* (Federation).—Although this crop was grown on stubble land it was freer from weeds than the preceding one, yet it contained a fair sprinkling of silver grass, thistles, and the ordinary weeds of the district. At the time of inspection, the crop was very green, and was just breaking into head, but being thin and patchy could not possibly make a very heavy crop.

CLASS IV.—BEST GROWING CROP OF WHEAT.

West of Naracoorte Range. Area at least one-fifth total area of wheat sown on farm, but not less than 25 acres. First prize, ½ ton Top Special High-Grade Super (presented by the Adelaide Chemical and Fertilizer Co., Ltd.). Also, first and second prizes, certificates. Entrance fee, 2s. 6d.

Under the same system of allotting points as for Class III., the three crops submitted in Class IV. were placed as follows:—

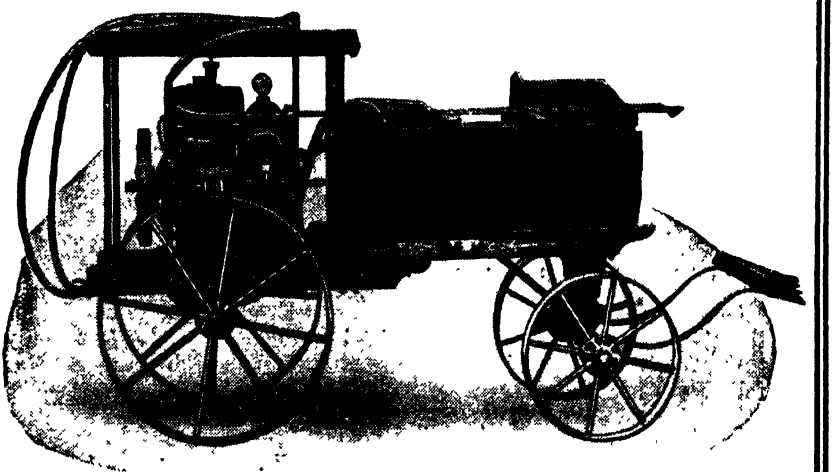
Name and Address.	Variety.	Apparent Yield.	Freedom from Disease.	Trueness to Type.	Freedom from Weeds.	Total.
		60	20	10	10	100
A. L. Johnson, Naracoorte	Currawa	47	18	9	9	83
J. Neagle, Naracoorte	Currawa	41	16	9	7	73
J. H. Williams, Lochaber	Major-Yandilla King	28	18	9	4	59

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The Crops Exhibited in Class IV.

1. *Mr. A. L. Johnson* (Currawa).—This crop was very green, and only just breaking into head, but in such an excessively wet season, the late seeding suited the crop, and although a little on the light side, was nice and regular. A little melilot, sheep weed, canary grass, and barley were in evidence, but on the whole the crop was fairly clean.

2. *Mr. James Neagle* (Currawa).—Parts of this crop were really good, but it was patchy and irregular. Too many weeds were present, those most in evidence being sheep weed, hoary cress, melilot, canary grass, and wild oats. Quite an appreciable amount of loose smut was present.

3. *Mr. J. H. Williams* (Major and Yandilla King).—This crop was very dirty, and about half the plants present were weeds, consisting mainly of poppies, wild oats, brome grass, silver grass, sheep weed, and slender thistle.

Class V.—Best Growing Crop of Oats.

East of Naracoorte Range. Area at least one-fifth of total area of oats sown on farm, but not less than 25 acres. First prize, 1 ton agricultural shell (presented by the Bonny Shell Co.). Also, first and second prizes, certificates. Entrance fee, 2s. 6d.

Oat crops, from a grower's point of view, must produce heavy yields of grain or hay, and stand up well enough to be harvested without a great deal of trouble, and from the buyer's viewpoint must be free from bad weeds and diseases, and so the judging of these crops has been done on these lines, giving most points to the more important subdivision of probable yield.

This particular season did not prove to be a very suitable one for the oat crops of the Naracoorte district, and as a consequence only three crops were left in this class, and they have been marked as follows:—

Name and Address.	Variety.	Apparent Yield.	Freedom from Disease.	Trueness to Type.	Freedom from Weeds.	Standing.	Total.
		60	10	10	10	10	100
P. A. Laurie, Kybybolite	Algerian	39	8	10	7	10	74
H. B. Schinckel, Kybybolite ..	Algerian .. .	37	9	10	6	10	72
F. C. Watson, Hynam	Algerian	24	8	10	6	10	58

The Crops Exhibited in Class V.

1. *Mr. P. A. Laurie.*—This was only a comparatively light crop, and as a consequence carried a fair number of weeds, consisting mainly of cape weed, hair grass, sorrel, and catchfly. A fair amount of loose smut was present.

2. *Mr. H. B. Schinckel.*—A thin, patchy crop, containing just a little loose smut, a lot of water grass (juncus), and some barley, saffron thistle, and slender thistle.

3. *Mr. J. C. Watson.*—A poor crop, being both thin and short, and containing the ordinary weeds of the district in plenty.

Class VI.—Best Growing Crop of Oats.

West of Naracoorte Range. Area at least one-fifth of total area of oats sown on farm, but not less than 25 acres. First prize, ½ ton high grade super, 45 per cent. (presented by Wallaroo-Mount Lyell Fertilisers, Ltd.). Also, first and second prizes, certificates. Entrance fee, 2s. 6d.

In Class VI. only two farmers submitted oat crops for competition, and these have been marked as follows:—

Name and Address.	Variety.	Apparent Yield.	Freedom from Disease.	Trueness to Type.	Freedom from Weeds.	Standing	Total.
		60	10	10	10	10	100
J. Neagle, Naracoorte	Algerian	50	9	10	8	10	87
A. L. Johnson, Naracoorte	Algerian .	33	9	10	6	10	68

The Crops Exhibited in Class VI.

Mr. J. Neagle.—Although this crop was a bit patchy, most of it was fairly good, and with the exception of one corner, but comparatively few weeds were present. A few heads of barley were noticeable.

Mr. A. L. Johnson.—This was a fairly regular, light crop, and was fairly clean, except for sorrel and quite a lot of barley.

GENERAL RECOMMENDATIONS.

This is the fifth consecutive competition which I have judged in this locality, and, in reporting on the previous ones, attention was drawn to various matters likely to improve the farming practices of the district.

In the *Journal of Agriculture* for January, 1920, the following points were mentioned:—

1. The scarcity of pigs.
2. The advantages of dairying.
3. The need of good rotation crops
4. Heavier manuring of crops to improve the stock-carrying capacity of the pastures in years following.
5. Correcting excessive acidity by applications of lime.
6. Drainage of surplus surface water.
7. The overstocking of pastures.
8. The excessive feeding off of crops.
9. Extending the areas under peas.

In the *Journal of Agriculture* for January, 1921, it was pointed out that the were still ample evidences that the above points held good, and the following improvements were enlarged upon:—

10. Improving pastures with subterranean clover.
11. Subdivision of holdings.
12. Summer crops.
13. Cultivation.
14. Varieties of crops.

In the *Journal of Agriculture* for February, 1922, these were again referred to, and the following further improvements were discussed in some detail:—

15. The presence of "take-all" in wheat crops.
16. The effects of superphosphate on pastures.
17. The presence of barley in crops.
18. Wimmera rye grass.

In the *Journal of Agriculture* for January, 1923, suggestions were made in connection with the following considerations:—

19. The great havoc being played with wheat crops by "take-all."
20. The small area under pea crops
21. The need of converting many "crop-growing" farms into "live-stock" farms.

It was observed during this year's tour of inspection that exactly the same faults noticed for the last four years are still in evidence, and still call for improvement, but possibly the points of most importance, and requiring comment at the present time, are:—

22. *Top-dressing Pasture Lands.*—In this particular district the top-dressing of pastures has passed the experimental stage, and fairly considerable areas are now receiving applications of fertilisers. To date, dressings of phosphatic manures have given the greatest increases yet noted, and these improvements in grazing capacity have been so great that it was not at all unusual to hear of farmers who intend applying 1cwt. superphosphate per acre to all of the land they are leaving out for pasture. One farmer, who has trebled the sheep-carrying capacity of his land by applying 1 bag of 45 per cent. superphosphate per acre, intends using this quantity on all of his large fields, and double that quantity on all small fields. Despite the very marked improvement made to pastures by fertilisers on so many farms in various parts of the district, there are still a great many landholders who have not realised the value of manuring their pastures. After discussing the advantages of top-dressing pastures with a large number of farmers who have been practising it for some few years now, it seems quite safe to make the assertion that in the Naracoorte and surrounding districts the application of the equivalent of 1cwt. superphosphate per acre per year will at least double the sheep-carrying capacity of the land, and at the same time the land will carry the increased number in much healthier and better condition than now applies on the unmanured lands. That this is a remarkably good business proposition will be readily realised if we remember that unmanured land carrying livestock at the rate of one sheep per acre per year can be made to carry two sheep per acre per year at an extra annual cost of about 7s. per acre, that is at the present price of superphosphate. A good growth of pasture plants will annually utilise all of the phosphoric acid in 1cwt. of superphosphate (36 per cent.) per acre, and so the land should at least receive that or its equivalent, and very possibly the cheapest way to provide the required phosphoric acid would be by heavy dressings of phosphates at comparatively long periods, rather than 1cwt. superphosphate per acre per year. At the present prices of phosphates, best money results would probably be secured by applying a mixture of 10cwts. ground raw

rock phosphate (82 per cent.), and 1cwt. superphosphate (45 per cent.) per acre, with the intention of not again manuring the land so treated for a period of 12 or 15 years.

23. *Seeding Land to Proved Pasture Plants.*—Although the climatic conditions of the Naracoorte district are very favorable to the growth of plants suitable for livestock, most of the soils do not produce really good grazing after clearing the timber, nor after cropping the land under the system at present practised This appears to be largely due to the great deficiency of phosphoric acid in these soils, and, as has been pointed out above, a very great improvement in this direction follows reasonable applications of fertilisers containing this necessary plant food. In the typical ironstone soils of that part of the district east of the Naracoorte Range there are good patches of land which will carry more than one sheep per acre per year after killing the "natural" timber, and after cultivating the land and growing crops with the minimum of phosphates, sorrel, silver grass, and stunted brome grass occupy most of the land. When cropping is continued with dressings of phosphates, hop clover, woolly clover, and cluster clover gradually make their appearance, and the brome grass plants become stronger, which additions improve the grazing capacity of the land very considerably. When the time arrives that a fair amount of phosphate has been put into the soils, and when such land is shut up as pasture and adequately manured with phosphates, wallaby grass reappears, and with the three clovers (hop, woolly, and cluster) and the brome grass, will make thick pastures from 12in. to 15in. high. capable of carrying livestock at the rate of 1½ to 2 sheep per acre per year. Now, with the exception of the wallaby grass, none of the abovementioned plants are really good grazing plants, and at least equal and possibly much better pastures can be produced in a shorter time by seeding the land to superior fodders. In this direction quite a number of farmers have proved the value of subterranean clover and Wimmera rye grass, and their introduction has proved a great benefit in every case where tried. Land seeded with a mixture of 10lbs. of Wimmera rye grass seed and 2lbs. of subterranean clover seed per acre, and receiving the equivalent of 1cwt. superphosphate per acre per year, will carry much more livestock than the same land not so seeded, and has the added advantage that if allowed to become dry a pasture composed of these plants remains good feed, a fact which does not apply to many other fodder plants. Both of these plants make good pasture if seeded separately, in which case subterranean clover should be seeded at the rate of 3lbs. or 4lbs. per acre, and be grazed carefully during its first year, and 12lbs. or 15lbs. of Wimmera rye grass seed per acre are necessary properly to establish this grass.

24. *Greater Subdivision of Holdings.*—The Naracoorte district is essentially suited to the production of livestock, but full results from pastures cannot be secured unless much subdivision of holdings is done. Maximum yields from fodder crops are only secured when these crops are cut and carted off the land, and when such crops are grazed; this is the ideal to keep in view, and the nearer the grazing approaches

the cutting and carting off, the greater will be the returns. This, of course, can only be done by having small fields, crowding large numbers of livestock on them for short periods, then moving the stock on to the next field. In this district where water is obtained easily and cheaply there is no excuse for not subdividing well, and when sown pastures and adequate top-dressing of pastures are the rule 20-acre fields will not be too small.

MOUNT GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR OCTOBER, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during October.	Per Cow during October.	Per Cow August to October.	Per Herd during October.	Per Cow during October.	Per Cow August to October.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
2/A	18·25	13·84	9932·5	544·25	1358·84	384·83	21·09	50·72
2/B	8	8	8711	1088·87	2733·00	270·51	33·81	87·56
2/C	18	15·84	12273	681·83	1718 64	412·33	22·91	60·00
2/E	15	11·55	11045·5	736·37	1648 57	401 49	26·77	70·77
2/H	22	22	18491·5	886·67	1956·65	655·87	31·50	70·70
2/I	12·84	12·29	11091·5	863·82	1924·32	390·57	30·42	69·65
2/J	12	10·94	13064·5	1088·71	2522·60	542·00	45·17	98·08
2/K	21·61	18·35	15264·5	706·36	1736·84	552·80	25·58	63·49
2/L	25	21·42	12910·5	516·42	1088·97	540·82	21·63	45·65
2/O	34·29	29·81	22996	670·63	1621·87	873·49	25·47	60·35
2/R	16·16	16·16	19372·5	1198·79	3160·17	692·15	42·83	120·15
2/S	5	5	4278	855·60	2297·60	177·69	35·54	100·75
2/T	11	10·61	10158	923·45	2400·63	359·63	32·69	90·57
2/U	16·68	14·45	16937·5	1015·44	2304·07	684·11	41·01	87·25
2/V	16·10	14·76	7874	489·07	1235·13	294·38	18·28	49·10
2/W	14·55	14·45	14101·5	969·17	2778·81	505·38	34·73	94·01
2/X	27·10	25·26	27200·5	1003·71	2229·76	876·71	32·35	75·01
2/Y	11	10·55	11218·5	1019·86	2470·77	414·81	37·71	95·81
2/Z	13·58	13·58	10110	744·48	2091·96	390·34	28·74	80·08
2/AA	24	22·61	18429·5	767·90	1721·74	664·31	27·68	62·46
2/BB	9	9	5750·5	638·94	1667·88	195·85	21·76	57·74
2/CC	12·39	11·90	7508·5	606·01	1494·51	284·97	23·00	57·94
Means	16·53	15·11	13123·61	794·17	1902·29	480·23	29·06	70·54

MOUNT GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during November.	Per Cow during November.	Per Cow August to November.	Per Herd during November.	Per Cow during November.	Per Cow August to November.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
2/A	17	15	12,645	743·82	2,102·66	486·26	28·60	79·32
2/B	8	8	7,515	939·37	3,672·37	248·04	31·01	118·57
2/C	18	14·83	11,068·5	614·92	2,333·56	397·81	22·10	82·10
2/E	15	14·63	13,170	878·00	2,526·57	500·48	33·37	104·14
2/H	21·03	22·30	16,990·5	807·92	2,764·57	643·48	30·59	101·29
2/I	14	14·30	12,804	914·57	2,838·89	465·70	33·26	102·91
2/J	12	12	12,465	1,038·75	3,561·35	497·59	41·47	139·55
2/K	23·50	20·60	17,045	725·32	2,462·16	584·39	24·87	88·36
2/L	25	20·90	12,607	504·28	1,593·25	520 54	20·82	66·47
2/O	34·83	32·10	21,280	610·97	2,232·84	777·95	22·34	82·69
2/R	15·20	15·20	17,229	1,133 49	4,293·66	703·47	46·28	166·43
2/S	5·33	4 80	4,611	865·10	3,162·70	239·10	44·86	145·61
2/T	12	10·90	11,013	848·04	3,248 67	373·67	29·76	120·33
2/U	17	16·80	18,501	1,088·29	3,392 36	697·07	41·00	128·25
2/V	18·10	17·87	12,034·5	664·89	1,900·02	457·24	25·26	74·36
2W	17·23	17·23	18,492·5	1,073·27	3,852·08	678·56	39·38	133·39
2/X	29·50	28·50	28,066·5	951 40	3,181·16	1,000·17	33·90	108·91
2/Y	11·87	10·87	9,845	829·40	3,300·17	369·99	31·17	126·98
2/Z	12·63	10·67	7,484·5	592 59	2,684·55	293·58	23·24	103·32
2/AA	24	24	16,965	706·87	2,428·61	613·57	25·57	88·03
2BB	9	9	6,270	696 67	2,364·55	227·77	25·31	83·05
2/CC	13	13	7,815	601·15	2,095 66	324·98	25·00	82·94
Means	16·96	16·07	13,450·77	792·88	2,697·40	504·61	29·74	100·36

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GLENCOE HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR OCTOBER, 1923.

Herd No.	Average Cows in Herd.	Average Cows in Milk.	Milk.		Butterfat.	
			Per Herd during October.	Per Cow during October.	Per Herd during October.	Per Cow during October.
			Lbs.	Lbs.	Lbs.	Lbs.
3/A	17	12·03	13166	774·47	484·71	28·51
3/B	14	9·23	4228·5	302·04	154·22	11·02
3/C	12	11·39	10004	833·64	358·56	29·88
3/D	12	7·03	4951·5	412·63	171·66	14·31
3/M	10	10	6200	620·00	226·18	22·62
3/G	10	8·87	7910	791·00	274·54	27·45
3/F	8	8	5363	670·37	196·26	24·53
3/H	14·65	12·65	7541	514·74	224·71	15·34
3/I	12	11·23	7050	587·50	269·74	22·48
3/J	13·68	12·68	5004·5	365·83	200·75	14·67
3/K	25	20·71	17167·5	686·70	654·29	26·17
3/L	18	17	10733	596·28	298·75	16·60
3/E	15·29	12·84	9016	589·66	359·99	23·54
3/N	20	17·55	11672·5	583·63	419·05	20·95
3/O	16	9	5518	344·87	190·38	11·90
3/P	14	12·13	9687	691·93	351·50	25·11
3/Q	61	51·48	38273	627·43	1426·55	23·39
3/R	17	17	14105	829·71	571·53	33·62
Means	17·20	14·49	10421·69	605·87	379·63	22·07

RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during November.	Per Cow during November.	Per Cow October to November.	Per Herd during November.	Per Cow during November.	Per Cow October to November.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
3/A	17	13·90	17,200·5	1,011·78	1,786·25	710·16	41·77	70·28
3/B	15·67	13·53	7,583·5	483·95	785·99	316·44	20·19	31·21
3/C	12	12	11,160	930·00	1,763·64	436·54	36·38	66·26
3/E	16	14·32	11,450	715·63	1,305·29	452·31	28·27	51·81
3/F	8	8	6,015	751·88	1,422·25	209·49	26·19	50·72
3/G	10	9	8,100	810·00	1,601·00	267·78	26·78	54·23
3/H	14	12·60	9,279	662·78	1,177·52	231·82	23·70	39·04
3/I	12	12	8,790	732·50	1,320·00	328·79	27·40	49·88
3/J	14	13	6,000	428·57	794·40	265·33	18·95	33·62
3/K	25	23·17	20,252·5	810·10	1,496·80	749·09	29·96	56·13
3/L	18	18	11,610	645·00	1,241·28	431·52	23·97	40·57
3/M	12·10	12·10	7,974	647·29	1,267·29	317·06	25·76	48·38
3/N	20	18	11,805	590·25	1,173·88	472·52	23·63	44·58
3/O	16	12·37	9,950	621·88	966·75	337·80	21·11	33·01
3/P	14	14	10,740	767·14	1,459·07	391·98	28·00	53·11
3/Q	61	59	47,985	786·64	1,414 07	1,847·70	30·29	53·68
3/R	17	17	14,115	830·29	1,660·00	589·59	34·68	68·30
3/D	12	7·40	5,355	446·25	858·88	199·18	16·60	30·91
Means	17·43	16·08	12,520·25	718·25	1,324·86	490·84	27·58	49·68

RIVER MURRAY HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during November.	Per Cow during November.	Per Cow October to November.	Per Herd during November.	Per Cow during November.	Per Cow October to November.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1/C..	32	26·43	22,563	750·81	1,645·39	738·17	24·81	59·90
1/J .	20·07	16·67	8,449	420·98	10,32·72	388·31	19·35	47 26
1/L .	19	18·23	14,613	769·11	1,555·19	597·52	31·45	65·95
1/M .	21	14·27	8,201	390·52	743·85	414·64	19·74	38·76
1/R .	16·80	15·90	9,916·5	590·46	1,197·28	483·34	28·77	56·49
1/T .	14	10·23	6,657	475·50	1,041·10	337·98	24·14	54·58
1/W	17·87	16	9,438	528·10	1,149·93	359·43	20·11	44·38
1/X .				Withdrawn	from Asso	ciation.		
1/Y .	19	15·87	11,544	607·58	1,320·60	554·16	29·17	62·22
1/Z..	21	18·47	12,377·5	589·38	1.274·76	614·69	29·27	60·64
1/Aa				Withdrawn	from Asso	ciation.		
1/Cc.	21·77	20·40	11,916·5	547·38	1,150·59	483·36	22·20	48·04
1/Dd	20	20	13,455	672·75	1,356·10	579·33	28·97	59·33
1/Ee	10	9·67	7,398	739·80	1,355·15	341·44	34·14	63·35
1/Ff	12	12	9,285	773·75	1,573·29	397·36	33·11	67·33
1/Gg	8	8	6,435	804·38	1,508·69	297·80	37·23	70·60
1/Hh	12·37	12·17	10,589	904·91	1,491·48	441·15	37·72	62·42
1/Ii .	13	13	9,315	716·54	1,380 35	384·31	29·56	56·90
1/Jj	15	10·83	7,935	529·00	1,006·13	341·97	22·80	43·51
1/Kk	14	9·53	7,758	554·14	980·39	359·78	25·70	45·57
1/Ll	9	9	5,160	573·33	1,165·77	253·74	28·19	57·32
1/Mm	16	16	9,915	619·69	1,208 47	453·13	28·32	55·28
Means	16·59	14·63	10,146·03	611·43	1.259·24	441·08	26·59	55·34

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"TAKE-ALL" INVESTIGATIONS.

The serious nature of the take-all disease of wheat in the newer wheat-growing areas of South Australia has led to arrangements being made with the Department of Agriculture for an extended investigation of the disease at the Laboratory for Plant Pathology at the University, in order to discover the best methods of control for this pest. It is very generally recognised that the disease does most harm in the more recently opened up mallee districts, and as the district around Pinnaroo is one which suffers perhaps more than any other, this was visited early in November by the Lecturer in Plant Pathology (Mr. Geoffrey Samuel, B.Sc.), in order to see the disease in the field, and obtain specimens with which to work in the laboratory. Through the courtesy of the local Branch of the Agricultural Bureau, which provided transport facilities, it was possible to visit a large number of farms and collect many samples. In a preliminary progress report on these investigations, Mr. Samuel says:—"It is well-known now that the take-all disease is caused by a minute parasitic fungus, which enters the roots of healthy wheat plants and feeds on the tissues of the roots and the bases of the stems, so that the wheat plant sooner or later dies. The black discoloration at the base of infected plants is due to this minute parasitic fungus, but the fungus itself is so small that its form can only be distinguished with the aid of a microscope.

Lines of Investigation.

There are two lines upon which an investigation of this disease must proceed at the commencement, but as the work progresses these should eventually supplement one another completely. In the first place, the parasite which causes the disease in the wheat must be isolated in the scientific laboratory, and its life-habits studied with the microscope and by other means, so that we can understand exactly how and when it attacks the wheat plant, and can judge and experiment with the best methods and time for killing it. In the second place, careful observation and study of the occurrence of the disease in the field may be expected to indicate useful methods of controlling it; for on visiting a take-all infected district it is immediately evident that all crops are not equally infected. Crops on exactly similar soil, with similar rainfall and climatic conditions, may be affected to a very different extent during the same season, while the degree of infection may vary from year to year on the same land. It is thus evident that by studying the history of land carrying healthy crops as well as of land carrying diseased crops, facts may be brought to light indicating which treatment of the land, and system of manuring, tends to check the disease, and which to favor it.

Both these lines of investigation will be followed up in the work being done on take-all. The investigation of the parasitic fungus in the laboratory has already commenced, but this part of the work requires careful study and a long time to complete. On the other

hand, the observations made on the crops at Pinnaroo indicate possibilities of a much better control of the disease by attention to certain cultural methods. Some account of these observations is here given.

Field Observations.

"From a review of the crops inspected the following statements are found to apply in the majority of cases:—The crops which suffered most from take-all were those following grasslands: if there had been a year of fallow the attack was not so bad; and if the grass land had been burnt before fallowing the crops were still better than in the previous case.

These facts immediately suggest that grassland is a carrier of the take-all disease; and so specimens of grasses from pasture-land were taken for examination. Of 14 different kinds of grasses examined, only two have so far been found to be affected by the take-all disease. These are barley grass and silver grass, unfortunately, the two dominant grasses in the pasture. Of these, silver grass is very rarely infected, and then only slightly; whereas barley grass is very badly attaked over a wide area. In many pastures near Pinnaroo, it is difficult to find any parts free from take-all-infected barley grass. This, then, is probably the explanation of the badly infected crops when grass land is ploughed in just before sowing. The take-all fungus can live for some time in the soil on any pieces of ploughed-in grass or stubble, so that when barley grass pasture is ploughed in before seeding, there may be take-all practically all over the field ready to attack the young seedlings. Barley grass on the fallows also may act as a carrier of take-all, which fact shows the great importance of keeping the fallows clean.

Grass Land Infection.

This bad take-all infection on barley grass raises the question whether it would not be better to try to cut grassland out of the rotation in the Pinnaroo area for some years. A rotation such as wheat-oats-bare fallow, or even wheat-oats-oats-bare fallow, might do much to check the disease. If necessary for stock, permanent pasture might be established, perhaps with a better grass than barley grass.

Burning the grassland or the stubble is beneficial. This was evident from comparison of crops sown on burnt and unburnt land; but is what might be expected, for the take-all fungus is killed by burning. The stronger the burn the greater the number of disease germs killed. It is not yet certain whether a very strong burn can kill *all* the fungus, but this is unlikely, for the fungus goes some distance down into the soil on the roots of diseased plants.

Another advantage in a burn is that there is not a quantity of dead wheat or grass to be ploughed in on which the fungus can grow. Then, if the fallows are kept clear of all grasses by good cultivation, much of the fungus in the soil germinates with the rains, and, finding no wheat or grass to grow on, eventually dies from starvation. The more frequent the cultivation the more completely the fungus can be got rid of. (This recommendation for burning only applies, of course, where take-all has been in the field. When the field is clean, and free from take-all, there are many advantages in ploughing in stubble.)

There is one other helpful practice which has frequently been emphasized by Mr. Spafford, that is, rolling. When thorough cultivation has made a good even seed-bed this is not so necessary; but where it has not been possible to cultivate sufficiently, and it is suspected that the seed-bed and the soil below are not properly compacted, rolling is said to have a very beneficial effect.

Early Varieties and More Manure.

Further, it was noticed that in the majority of cases the early wheats were not so badly attacked as the late varieties. No definite explanation can at present be offered for this. More work in the laboratory and in the field on time of infection, stages of infection, temperature for infection, etc., may give the correct explanation later on. This observation could be utilized to some extent even now, however, by sowing early varieties in preference to late on land which is still suspected to contain the take-all disease.

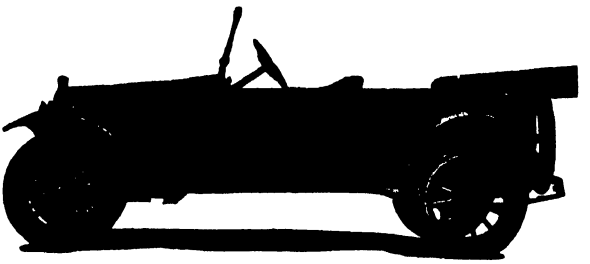
The use of heavy dressings of superphosphate has been found largely to control take-all on the West Coast, but no comparison could be made between heavily and lightly dressed crops at Pinnaroo, because 60-90lbs. was the average dressing used on practically all farms. One farmer, however, had sowed a strip with 2cwts. super., alongside ones with 90lbs. and 56lbs. The strip which had received 2cwts. was certainly free from take-all, but the one with 90lbs. was also almost free; there was more take-all on the 56lbs. strip. This single experiment is not sufficient to justify the formation of a definite opinion on the effect of different dressings of super on the take-all disease in Pinnaroo soils. It is hoped to carry out more extensive experiments on manurial treatments next year.

The State of the Soil.

A question which may now be raised in connection with the greater prevalence of take-all in recently opened up mallee lands is this:—It is due to some factor in the soil, and if so, what? Is there something more than the abundance of take-all infected barley grass at Pinnaroo, which may help to account for the greater susceptibility of this land to take-all.

Some work done by R. S. Kirby, on the take-all fungus in America suggests a line of investigation of this. Kirby finds that the fungus grows best on substances with an alkaline reaction, and that substances with an acid reaction tend to stop the growth of the fungus. May it be, then, that the soil solution in Pinnaroo soils is more alkaline. (This does not refer to the absolute alkalinity, or lime-content, of the soil, but to the reaction of the soil solution, than in areas where take-all is less destructive, and that this to some extent explains its greater severity at Pinnaroo.)

In this connection it is interesting to recall the history of the Lower Northern areas and of Yorke's Peninsula. It is well-known that take-all was formerly very prevalent in both these areas, but now occurs only rarely. Is this to be explained by improvement in cultivation methods, or by some increase in the acidity of the soil, or perhaps by both acting together? It is known from experience in other parts of the world that alkaline soils, when brought into cultivation, become



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generally less alkaline owing to the ploughing in of plant remains and the consequent formation of humic acid. No figures as to the reaction of the agricultural soils of South Australia are available, however, a fact which emphasizes once again the need for a soil survey of this State. In order to test the above question, therefore, soil samples were taken at Pinnaroo, and these will be compared with samples from other areas. The details of these tests, and a discussion of their relation to take-all will be published in future numbers of the *Journal of Agriculture*, in the periodical progress reports of the investigations.

Summary.

A brief summary of what is so far known of the control of take-all by cultivation may be given thus:—

Burn the stubble early after take-all.
Fallow early.
Keep the fallows clean, especially from barley grass, by cultivating.
Cultivation also makes a better seed-bed.
Roll if the seed-bed is not well compacted
Use more superphosphates (1cwt. per acre is suggested for Pinnaroo until further experiments are made.)
Consider taking grasslands out of the rotation in bad take-all areas. Wheat-oats-bare fallow, or wheat-oats-oats-bare fallow are suggested.
Sow early wheats if take-all is still suspected to be in the land.

THE AGRICULTURAL OUTLOOK.

Booborowie.—The weather for December has been extremely cool and wet, 253 points having been registered up to the time of writing. The crops are quite ripe and waiting to be taken off, and heavy yields are expected. Natural feed is plentiful. The stock are all in good condition. Pests—Numerous summer noxious weeds are making their appearance under very favorable conditions. Miscellaneous —Farmers have done little or no stripping of crops, owing to the continuous wet and cold weather.

Eyre Peninsula.—Weather—A considerable amount of thundery weather and several rainy days were experienced. A total of 157 points of rain fell during the month. Exceptionally bad harvesting weather has prevailed, with cool mornings, and so growers have only been able to reap during the mornings on very few occasions .Crops are standing up to the weather exceptionally well, except Early Gluyas and King's, which have lodged badly. Crops in district have yielded 33bush. per acre. A week of decent weather would enable farmers to complete harvesting. Fruit crop is very disappointing, there being a poor setting of nearly all fruits. Natural feed is showing up green again since the rains, and will make it bad for burning should we get any more rain. Stock are all in good condition and free from disease. Pests—Rabbits are becoming numerous.

Turretfield.—Weather—This month has been wet beyond the average; 242 points of rain were registered, 96 points fell in one shower on December 17. Crops—Hay cutting is finished, but very little hay is carted, so far the bulk is stooked in the fields. Reaping has been started in barley, oat, and early wheat crops. Natural feed is mostly eaten out. Farmers will be glad of their stubbles as soon as available. Stock is in very good condition; fat sheep and lambs have been disposed of. Pests—Starlings are numerous and doing some damage in the gardens.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Ltd., reported on January 1st, 1924:—

BUTTER.—During the month production of all grades of butter kept up remarkably well, due to the late rains which prolonged the season. In the early part of the month fairly large shipments were made to interstate and oversea buyers, but towards the end of December a shortage of choicest quality was being felt, which accounted for an advance in values of top grades, whilst lower grades also advanced accordingly. Choicest factory and creamery fresh butter, in bulk, 1s. 7¾d. second grade bulk, 1s. 3d.; best separators and dairies, 1s. 5½d. to 1s. 7d.; fair quality, 1s. 4d. to 1s. 4½d.; store and collectors', 1s. 2½d. to 1s 4d.; heated lots, 1s. 1d.

EGGS.—Fairly extensive quantities were marketed, and with local purchasers operating freely at each auction, all consignments submitted were readily cleared, values recording a slight fluctuation. Fresh hen, 10½d.; duck, 11½d. per dozen.

CHEESE.—The feature of this line has been the exceptionally brisk local demand. Although large quantities have been consigned from the South-Eastern factories, all available stocks have been disposed of at slightly better values than ruled during the previous month, the range being 1s. to 1s. 2d. for large to loaf.

HONEY.—Since our last report the market has advanced ½d. per lb. for new season's prime liquid, owing to the strong interstate inquiry. Prime clear extracted in liquid condition, 4½d. to 4¾d.; best candied lots, 3½d. to 3¾d.; lower grades, 2d. to 2½d.; beeswax realising for clean samples 1s. 4d. per lb.

ALMONDS.—As a result of local and interstate purchasers only operating on a small scale, values have receded ½d. per lb. as compared with our previous quotations Brandis, 9d. to 9½d.; mixed softshells, 8d. to 8½d.; hardshells, 4½d.; kernels in strong request at 1s. 5d. Walnuts, 1s.

BACON.—Excellent demand ruled for this line, supplies of middles and rolls being hardly equal to trade requirements. However, curers held ample stocks of sides and hams, for which a heavy call was experienced. Best factory-cured sides, 1s. 3d.; middles, 1s. 4½d. to 1s. 5d.; hams, 1s 8d.; Hutton's "Pineapple" brand hams, 1s. 9d. per lb.

LARD.—Hutton's "Pineapple" brand, in packets, 1s. 1d.; in bulk, 1s. per lb.

LIVE POULTRY.—At each sale we submitted an extensive catalogue, which met with good demand, buyers bidding keenly where quality was right, and all consignments realised satisfactory values, the only line not receiving the good attention of purchasers being birds of light breeds, prices for which receded so as to effect clearances. The Abattoirs' strike induced farmers to forward their surplus poultry earlier in the month, and it was felt by the trade that supplies would probably be short during Christmas week, but such was not the case, as we were forced to hold daily sales to cope with the very large quantities which came to hand. Crates obtainable on application. The following rates ruled at our last auction:—Prime roosters, 5s. to 7s. 6d. each; nice-condition cockerels, 3s. to 4s. 9d.; poor-condition cockerels, 2s. to 2s. 6d.; plump hens, 3s. 6d. to 5s.; medium hens, 2s. 9d. to 3s. 3d.; some pens of weedy sorts lower. Geese, 5s. 10d. to 8s. 6d.; ducks, good condition, 5s. to 8s.; do., fair condition, 3s. 6d. to 4s. 9d.; turkeys, good to prime condition, 1s. 2d. to 1s. 10d. per lb. live weight; do., fair condition, 11d. to 1s. 1d. per lb. live weight; do., fattening sorts lower. Pigeons, 8d. each.

POTATOES.—At the end of the month prices eased considerably, owing to the increased supplies obtainable from Victoria, and new Victorians are now realising 10s. 6d. to 11s. 6d. per cwt. on rails.

ONIONS.—Best quality white onions, at 9s. 6d. per cwt. on rails.

ANALYSES OF SAMPLES OF FERTILIZERS.

The following are the results of analyses made by the Government Agricultural Analyst (Mr. C. E. Chapman) of samples of fertilizers taken by Assistant Inspectors J. Hunter and J. B. Harris during the year ended December 31st, 1923:—

Reference.	Name of Firm and Fertilizer.	Phosphate.						Nitrogen.		Potash, K_2O.		Bone Manure, Fine Material.	
		Water Soluble.		Citrate Soluble.		Acid Soluble.							
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.
	Adelaide Chemical & Fertilizer Co., Ltd.—	%	%	%	%	%	%	%	%	%	%	%	%
1279 ...	Top Special Super.	45·0	45·0	—	—	—	—	—	—	—	—	—	—
1280	Mineral Super.	36·0	36·3	—	—	—	—	—	—	—	—	—	—
1281	Guano Super.....	27·0	28·7	3·0	3 0	3·0	4·8	—	—	—	—	—	—
1282	S.A. Super.	30·0	29·9	—	—	—	—	—	—	—	—	—	—
1283	Bone Dust	—	—	—	—	40·0	43 1	3·25	4·1	—	—	40·0	59·5
1284	Wheat Manure	28·0	29·9	5·0	6·2	3·0	5·9	1·05	1·0	—	—	—	—
1450	*Sulphate of Ammonia	—	—	—	—	—	—	20·0	20·1	—	—	—	—
1451	†Guano Super.....	27·0	31·2	3·0	2·0	3·0	4·7	—	—	—	—	—	—
1452	‡Vine Manure	20·0	19·3	8·0	9·0	4·0	4·8	1·5	1·5	4·5	4·5	—	—

* Taken from Mr. Theodor Ey, Gawler. † Taken from Mr. T. J. Wilkinson, Gawler. ‡ Taken from Angaston Fruitgrowers' Co-operative Society, Angaston.

January 2nd, 1924.

GEO. QUINN, Chief Inspector of Fertilizers, &c.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, December 12th, there being present Mr. W. S. Kelly (Deputy Chairman), Capt. S. A. White, Col. Rowell, and Messrs. C. J. Tuckwell, A. M. Dawkins, F. Coleman, J. W. Sandford, W. G. Auld, and the Secretary (Mr. H. J. Finnis). Apologies were received from the Minister of Agriculture (Hon. J. Cowan M.L.C.), Professor Arthur J. Perkins, Messrs. H. Wicks, and W. J. Colebatch.

Crop and Fallow Competitions.—The Secretary of the Board reported that the Government had approved of a subsidy of £5 to the Miltalie Branch in connection with the crop-growing competitions.

Conservation of Waters of Finniss and Angas Rivers.—The recent Conference of Southern Branches of the Agricultural Bureau resolved, "That the Government be requested to conserve the waters of the Finniss and Angas Rivers for Irrigation purposes". The matter was referred to the Minister of Irrigation, who reported that in view of the pressure of work by the Irrigation Commission the matter could not be considered at present.

Standardizing Spraying Compounds.—Congress of 1923 resolved—"That the Government be asked to fix a standard for all spraying compounds and that the manufacturers be requested to conform to same." The Horticultural Instructor (Mr. George Quinn), to whom the matter was referred has supplied the following report:—"I desire to report that the department has not been unmindful of the want which this resolution voices, because under the Insecticides Act, No. 1013 of 1910, the fixing of standards for insecticides and fungicides was strongly stressed. A similar provision was contained in a Victorian Act passed with the object of standardizing these utilities. The Victorian Department of Agriculture attempted by carefully drafted regulations, to achieve this object, and kindly supplied copies of their regulations to this Branch when our Act of 1910 was passed. With the assistance of the Director of Chemistry (Dr. Hargreaves), I endeavoured to reduce the matter to exact expression covering a workable basis, but notwithstanding the great knowledge brought to bear by my collaborator we found ourselves hopelessly unable to evolve anything satisfactory. It was found when the great field of remedies and reagents was brought under review the task was a stupendous one. Of course, a few, like arsenate of lead, lime sulphur compounds, and sulphate of copper could be standardized, but most insecticides designed for a special purpose are compounds of a variable character compiled on empirical formulae, though perhaps each one is fairly effective if applied with proper consideration of all the circumstances. The principal defect in fixing a legally non-variable standard for an insecticide lies in the fact that such can only apply to one brand or name, and the vendor can withdraw his goods or cease manufacturing, and put out something of a similar mixture under another name, thus

leading those who try to accomplish the standardization around in a circle. It was the realisation of this which caused us to recommend the Act of 1910 to be repealed and substituted by another measure 'The Insecticides Act, No. 1377 of 1919,' which throws the onus on the vendor of fixing, registering, guaranteeing, and maintaining a standard of any insecticide, fungicide, or vermicide which he may offer for sale, just as is done with fertilisers under the Fertilisers Act. As this Act provides for the branding of every parcel sold with the guaranteed percentage of its constituents, and condition of such insecticidal ingredients, the purchaser would, if the law were enforced, be in a position to see whether he was receiving what he agreed to purchase. Further, the department under this later law has power to publicly expose in the press useless nostrums or spurious compounds put forward as insecticides, &c. No attempt has been made to enforce this law, notwithstanding that so far back as 23/8/21 representations were made to a former Minister pointing out that the desirableness of doing so to meet such requests as is contained in this resolution." It was decided to suggest to the Minister that action should be taken to have the Act enforced.

Horehound as a Noxious Weed.—In reporting on the resolution carried at Congress—"That the plant known as horehound should be proclaimed a noxious weed," the Professor of Botany (Professor T. G. B. Osborn D.Sc.,) says:—"Horehound (*Marrubium vulgare L.*), a native of Europe, was included by F. von Mueller in his list 'Select Extratropical Plants' as desirable to cultivate in Australia. Its value lies in its medicinal property (the principle Marrubin) used in the treatment of coughs. It is a perennial and a free seeding plant. In fruit, the calyx teeth become hardened and form a small burr that clings to wool. The plant prefers dry upland pastures. Horehound is a proclaimed weed for certain shires in Victoria. Pastures on the Pacific Coast of United States of America are said to be so overrun by the weed that all other growth is crowded out. It can be controlled by (*a*) frequent cutting to prevent seeding, (*b*) bringing the land under cultivation, when tillage promptly destroys the weed. I consider that it is a decidedly objectionable weed in that stock will not eat the plant because of its bitter taste, and that its luxuriant growth crowds out other vegetation on some soils. Whether its proclamation as a noxious weed will have any effect in checking its spread is a matter involving a question of policy upon which I cannot express an opinion". It was decided that a copy of the report should be forwarded to the Georgetown Branch, pointing out that there was no evidence from other districts to show that the plant was spreading rapidly, and asking for information regarding the reasons which had led them to urge the inclusion of the plant on the list of noxious weeds.

Fertilisers Act.—The following resolution was carried at the 1923 Congress:—"That in the opinion of Congress the Fertilisers Act should be amended in such a manner as to require guarantees to indicate the phosphoric acid content instead of the tricalcic phosphate". The following report on the matter was supplied by the Horticultural Instructor (Mr. Geo. Quinn):—"I have read the resolution, and regret not having been able to be present at the Congress when the discussion

WHEN POULTRY KEEPING IS MOST PROFITABLE.



Taking it by and large, poultry keeping is a game of many ups and downs for the poultry keeper who takes no precaution to keep his hens laying consistently the whole year round. The profits made when eggs are plentiful very quickly diminish when "Winter comes" and eggs are scarce. And yet, making sure of a good Winter egg supply involves only the expenditure of a ha'penny a day for every 12 fowls and the very little effort involved in mixing

'KARSWOOD' POULTRY SPICE

with the wet or dry mash. This is a fact well known to prominent breeders and to over half a million small poultry keepers throughout the World. 'KARSWOOD' supplies tonic ingredients and food properties which promote health and vigor in the birds, thus enabling them to produce more eggs by natural means, and to effect a quick and thorough moult, and get down to the business of earning profits again without delay.

By starting 'KARSWOOD' feeding now, you are insuring your Winter profits, you are increasing the value of your birds, and you are making certain of fertile, hatchable eggs and healthy chicks when next the breeding season comes around.

Start this insurance to-day. Go to your local grocer, storekeeper, or produce dealer, get a 1s. packet and commence feeding to-morrow. If your local dealer cannot supply you, he can get supplies from the Agents named below.

NOTE THE ECONOMY.

One tablespoonful (½oz.) of 'KARSWOOD' Poultry Spice (containing ground insects) is sufficient for 20 hens for one day. So that it costs you less than a ½d. a day for 12 birds.

1s. packet (½lb.) supplies 20 hens 16 days.
2s. packet (1lb.) supplies 20 hens 32 days.
12s. tin (7lbs.) supplies 140 hens 32 days
14lbs. tins, 25s. 28lbs. tins 48s.

Makes 12 Hens Lay for ½d. a Day.

AGENTS FOR SOUTH AUSTRALIA—

S. C. EYLES & Co.,
CURRIE ST., ADELAIDE.

upon it took place. The matter was not lost sight of when the present Fertilisers Act was being drafted in 1918. It was ascertained at that time that the expression of the phosphatic contents in terms of phosphoric acid had been adopted into the laws of the other States of the Commonwealth dealing with Fertilisers, but the feeling which Dr. Hargreaves shared with me at that time was that usage had made the terminology of our law reasonably understandable to our farmers and gardeners. I presume the object of the mover of this resolution was to secure uniformity, more particularly if his supplies of fertilisers are likely to be brought over the border from Victoria or New South Wales. In-so-far as the relative accuracy of the terms is concerned, guarantees given to indicate the phosphoric acid content are no more correct and probably less informative to the average user than are the terms 'Water Soluble' and 'Acid Soluble' phosphates. Dr. Hargreaves informs me that at the Conference of Agricultural Analysts, held in Melbourne during May of this year, it was resolved that it was desirable that the Fertilisers Act of the various States should be amended and brought into line in-so-far as uniformity was concerned. The New South Wales Department of Chemistry undertook to draft a uniform Bill to submit to the other States, and although not hostile to the request of the Bureau Congress, I do not recommend any amendments to our Fertilisers Act until the draft is forthcoming."

Michaelmas Holidays.—The resolution, "That the Education Department be asked to alter the date of the Michaelmas holidays to synchronise with Show Week so that country children might have an opportunity of attending the show," which was carried at the 1923 Congress, was again brought before the Board, when it was decided that the resolution should be transmitted to the Royal Agricultural and Horticultural Society, asking their support of the resolution.

Rail Fares to Winter School at Roseworthy Agricultural College.—Information was received from the Chief Railways Commissioner, that arrangements would be made with the Roseworthy Agricultural College to grant the request of the 1923 Congress that Branch members, irrespective of age travelling to the Winter School at Roseworthy Agricultural College should be granted railway tickets at excursion rates.

Allotment of Dry Blocks on Irrigated Areas.—The Irrigation Commission, in reply to a resolution carried at Congress, "That the Government be asked to expedite the allotment of dry blocks in the irrigation areas to overcome the shortage of wood supplies for settlers' use," stated that every endeavour was being made to expedite the allotment of all unallotted blocks in the irrigation areas, and it was anticipated that a number of dry blocks in the Berri and Cobdogla areas would be offered at an early date.

Compulsory Registration of Stallions.—The Secretary reported that the resolution passed at Congress "That it is desirable to provide for the compulsory registration of stallions," had been noted by the Minister.

Size of Cornsacks.—The Marama Branch, which was responsible for the resolution carried at Congress, "That all bags in a bale be made the same size," submitted two cornsacks, showing a considerable variation in size, for the examination of the Board. After a full discussion, it was decided, on the motion of Mr. A. M. Dawkins, seconded by Mr. F. Coleman, "That the bags be forwarded to the Controller of Customs with the request that the necessary action be taken to avoid a repetition of the trouble." On the motion of Mr. C. J. Tuckwell, seconded by Capt. White, it was also resolved, "That the Secretary of the Board should ask the Marama Branch to keep a record of the numbers of the bales that contained sacks of an irregular size, and also the name of the firm from whom the bags were obtained, in order that the name of the manufacturer might be traced.

Veterinary Surgeon for Eyre Peninsula.—At the recent Conference of Eyre Peninsula Branches it was resolved,—"That the Government be asked to station a Veterinary Surgeon on Eyre Peninsula, and that it be assured that the Conference, in making this request, agrees to the principle of payment by stockowners for services rendered by such officer." On the motion of Capt. White, seconded by Mr. A. M. Dawkins, it was decided—"That the Government be asked to appoint an officer to the position of Government Veterinary Lecturer." The Board also desired to place on record the valuable services that had been rendered by Mr. F. E. Place during the time that he toured the country in the position of Government Veterinary Lecturer.

Fruit Cases.—The Longwood Branch forwarded the following resolution—"That in the event of an Act coming into force relating to the manufacture of fruit cases, that it be made compulsory that all standard cases be made with soft wood ends as an insurance against excessive shrinking or warping." The Secretary was instructed to ask Mr. H. Wicks, who had been closely connected with the matter, to prepare a report on the subject.

Crop Competitions.—The Naracoorte Branch asked that the minimum area of 50 acres of crop to be entered for competition under the scheme inaugurated by the Advisory Board, be reduced to 25 acres, or that one-fifth of the total area of land sown on a farm be eligible for the competition. It was decided to refer the matter to the Committee appointed by the Government to manage the competitions.

Refrigeration of Fresh Fruit.—The Hills Conference resolved—"That reports of the investigations recently carried out relative to the refrigeration of fresh fruit be forwarded to all Branches of the Agricultural Bureau, interested in the export of apples." It was decided to ask the Minister to secure sufficient copies of the report to enable each Branch interested to have a copy.

Space in the Journal of Agriculture for Fruit Growing and Mixed Farming.—The Conference recently held at Balhannah requested that more space be allotted in the *Journal of Agriculture* to mixed farming and fruit growing. The Secretary reported that arrangements had already been made to accede to the request of the Conference.

Fruit Diseases Act.—It was decided to ask the Horticultural Instructor (Mr. Geo. Quinn) to furnish a report on the following resolution that had been carried at the Hills Conference—"That the Government take more drastic action to prevent the sale of codlin moth infected fruit, other than to a factory."

Rail and Telephone Charges.—The Board received the following resolution from the Conference of Murray Mallee Lands Branches—"That railway and telephone charges be reduced."

Red Wheats.—The following resolution was carried at the 1923 Conference of Murray Mallee Lands Branches of the Agricultural Bureau.—"That the Department of Agriculture compile and publish a list of red varieties of wheats and of white varieties of wheat which are likely to prove efficient substitutes." It was decided to ask the Director of Agriculture to agree to the request of the Conference and that the list should be published in the *Journal of Agriculture.*

Mr. J. W. Sandford.—Mr. J. W. Sandford intimated that owing to the expiration of his term of office as President of the Royal Agricultural and Horticultural Society, he was reluctantly compelled to sever his connection with the Board. Capt White said he felt sure he was voicing the opinion of members when he said how sorry they were that Mr. Sandford was severing his connection with the Board. He wished to place on record the very valuable advice and help that Mr. Sandford had ever been ready to give to the Board. Messrs. W. S Kelly, F. Coleman, A. M. Dawkins, and C. J. Tuckwell supported.

Visit of Board to Berri Orchard.—It was decided that the Board should visit the Berri Experimental Orchard on January 23rd, 1924.

New Members.—The following names were added to the rolls of existing Branches:—Brentwood—L. Watters; Redhill—J. T. Grose, F. Mahone; Blyth—P. Vogt, E. Walsh, L. C. Mugge; Mount Barker—P. Pondt, W. Blades; Balhannah—M. Rose; Light's Pass—A. Chapman, J. Craig, A. Scholz; McLaren Flat—J. McMurtie, W. R. Duport, C. Burgan, C. Elliott, W. G. Oakeley, A. W. Cross; Aldinga—T. Harvey; Tweedvale—H. G. Schubert, Hugo Berth, F. F. Schapel, J. C. W. Seidel, R. F. Seidel, H. A. Schapel, W. T. Stone, J. C. R. F. Paelchen, W. H. A. Seidel; Balaklava—A J. Marrion, F. W. Webb, A. Anderson, A. McDonald; Rendelsham—W. Bignell; Arthurton—J. Frances, E. G. Noall; Allandale East—E. Jennings; New Residence—J. A. Voigt, C. Wedding; Tarcowie—J. Harvie; Gladstone—J. Eley, H. J. P. Kumnick, S. McLeod; Penola—W. Balneaves; Farrell's Flat—P. Maheniphy; Meadows—W. R. Pattrick; Shoal Bay—F. E. Kaeshagen, T. Beare; Kybybolite—H. Pettit, J. Kealy; Berri—A. Smith; Kilkerran—T. G. Sutter, A. E. Lehman; Bethel—E. N. Seigat, E. R. Weichert, W. C., W. B., and H. M. Peltz.

ORCHARD NOTES FOR SOUTHERN DISTRICTS FOR JANUARY, 1924.

[By C. H. Beaumont, Orchard Instructor.]

Fruit harvesting will be in full swing this month. Very often this operation is the most carelessly performed of all the orchard practices. A grower will take every care in tilling, pruning, and spraying, and then lose the benefit of his work by careless picking and packing. A good pack makes a good name and the consumer soon knows where he can place orders with confidence. So pick carefully and pack thoroughly. Badly graded, and badly packed fruit lessens the demand and lowers the price. Do not waste any fruit. Have your trays ready, and dry all not wanted fresh. To get good dried fruit you must have good fresh fruit. Small and damaged fruit makes a poor product and spoils prices.

Continue with budding operations, taking care to use only plump, healthy buds, from known trees. Protect apples and pears by keeping the spraying outfit busy; codlin moth will do very little damage if a coat of arsenate of lead be kept on the fruit. Moth infested windfalls spread the insect more than any other means, so keep the land clear. Pigs enjoy windfalls.

Lime sulphur solution will keep fungus pests in check during summer. Spray vines with Bordeaux mixture as a protection against downy mildew. Currant and raisin growers should have their evaporators ready for use. They may not need them, but it is well to be ready and save delay if the weather is cloudy and damp at drying time. Watch hawthorn hedges, &c., for pear slug and give them a good dusting with earth, slack lime or ashes. This will help to keep the fruit trees free. Any pear slug affecting apple, pear or cherry trees will be controlled by the arsenate of lead spray.

THE McGILLIVRAY

Patent Rotary Grain Pickler

Unequalled for speed and efficiency.

ENSURES that EVERY GRAIN is WELL RUBBED in the PICKLE

Obviates any possibility of over or under pickling your grain.

YOU CANNOT HAVE SMUT IF YOU USE THIS MACHINE.

A BOY CAN EASILY OPERATE IT, AND PICKLE 100 BAGS A DAY.

See it in operation and judge its merits for yourself.

ALL INQUIRIES TO—

J. L. CAMPBELL & Co., Currie Street, Adelaide

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., NOVEMBER, 1923.

IMPORTS.

Interstate.

Apples (bushels)	15,001
Bananas (bushels)	10,358
Gooseberries (bushels)	4
Loquats (bushels)	1
Passion Fruit (bushels)	131
Pineapples (bushels)	124
Cucumbers (bushels)	366
Onions (bags)	491
Potatoes (bags)	10,077
Bulbs (packages)	32
Plants (packages)	77
Seeds (packages)	42
Wine casks, empty (number)	3,202

Rejected—1bush. of apples and 18bush. bananas.
Fumigated—16 wine casks.

Overseas.

Federal Quarantine Act.

Seeds, &c. (packages)	10,425

EXPORTS.

Federal Commerce Act.

Three thousand two hundred and sixty-one packages of dried fruit, 580 packages of citrus fruit, 80 packages of preserved fruit, and 1 package of honey were exported to overseas markets. These were consigned as follows:—

London.

Dried fruit	2,364
Honey	1
Oranges	3

New Zealand.

Dried fruit	225
Citrus fruit	577
Preserved fruit	80

India and East.

Dried fruit	232

Vancouver.

Dried fruit	120

South Africa.

Dried fruit	320

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month of and to the end of December, 1923, also the average precipitation to the end of December, and the average annual rainfall.

Station.	For Dec., 1923.	To end Dec., 1923.	Av'ge. Annual Rainfall
Far North and Upper North.			
Oodnadatta	3·25	5·49	4·94
Marree	1·06	4·76	6·07
Farina	1·47	6·82	6·66
Copley	1·16	6·73	8·39
Beltana	1·54	7·70	8·97
Blinman	2·64	11·22	12·53
Tarcoola	2·55	5·52	7·74
Hookina	3·16	10·60	13·46
Hawker	3·03	13·61	12·92
Wilson	4·08	14·29	12·58
Gordon	4·26	10·96	11·55
Quorn	3·90	16·07	14·21
Port Augusta	2·71	10·09	9·67
Port Augusta West	2·38	9·10	9·71
Bruce	5·13	12·45	10·77
Hammond	4·93	16·04	11·91
Wilmington	2·59	19·25	18·39
Willowie	4·61	18·12	12·57
Melrose	3·97	31·09	23·40
Booleroo Centre	5·03	22·78	15·65
Port Germein	1·48	13·07	12·89
Wirrabara	2·74	23·06	19·78
Appila	2·36	17·59	15·00
Cradock	3·51	11·89	11·52
Carrieton	3·06	14·87	12·90
Johnburg	5·50	14·05	10·91
Eurelia	5·05	16·05	13·54
Orroroo	1·74	13·68	13·73
Nackara	2·85	9·08	11·99
Black Rock	2·70	16·68	12·75
Ucolta	1·68	9·81	12·04
Peterborough	3·11	16·24	13·53
Yongala	4·07	20·75	14·58
Lower North-East.			
Yunta	2·23	5·77	8·88
Waukaringa	1·15	5·95	8·54
Mannahill	2·66	6·94	8·67
Cockburn	2·41	7·31	8·31
Broken Hill, N.S.W.	3·26	10·22	9·98
Lower North.			
Port Pirie	2·70	15·53	13·55
Port Broughton	1·16	15·88	14·29
Bute	2·30	20·13	15·78
Laura	1·65	22·09	18·26
Caltowie	2·47	20·59	17·20
Jamestown	3·82	24·53	17·89
Bundaleer W. Wks.	4·74	22·28	18·09
Gladstone	1·97	22·57	16·29
Crystal Brook	1·80	18·20	15·95
Georgetown	2·28	23·02	18·55
Narridy	1·63	15·28	16·37
Redhill	3·98	19·64	16·94

Station	For Dec., 1923.	To end Dec., 1923	Av'ge Annual Rainfall
Lower North—*continued.*			
Spalding	4·48	19·57	20·27
Gulnare	3·74	21·87	19·36
Yacka	3·82	18·56	15·48
Koolunga	3 57	18·24	15·89
Snowtown	1·48	17·02	16·07
Brinkworth	2·78	18·54	16·30
Blyth	2·00	18·93	17·03
Clare	3·64	32·25	24·68
Mintaro	2·92	33·35	23·57
Watervale	2·30	31·77	27·54
Auburn	2·23	27·87	24·35
Hoyleton	1·76	18·05	17·91
Balaklava	2·41	17·51	15·95
Port Wakefield	1 09	13·33	13·28
Terowie	2·82	13·99	13·82
Yarcowie	2·93	12·98	14·22
Hallett	1·79	18·10	16·49
Mount Bryan	3·72	22·99	16·81
Kooringa	3·03	21·29	18·09
Farrell's Flat	3·00	23·21	19·00
West of Murray Range.			
Manoora	2·27	25·52	18·92
Saddleworth	2·46	25·38	19·78
Marrabel	2·83	29·34	19·78
Riverton	2·74	29·72	20·79
Tarlee	2·71	28·69	17·93
Stockport	2·55	26·72	16·63
Hamley Bridge	2·43	25·63	16·59
Kapunda	3·97	29·42	19·89
Freeling	2·04	26·22	17·99
Greenock	2·33	32·13	21·68
Truro	2·63	30·24	20·20
Stockwell	2·60	29·94	20·32
Nuriootpa	2·91	28·16	21·00
Angaston	2·28	30·16	22·53
Tanunda	2·15	31·70	22·24
Lyndoch	2·84	40·64	22·93
Williamstown	3·29	39·30	27·48
Adelaide Plains.			
Mallala	1·72	24·42	16·72
Roseworthy	1·93	25·90	17·35
Gawler	2·00	27·37	19·11
Two Wells	2·31	22·63	15·88
Virginia	2·42	25·71	17·32
Smithfield	2·38	26·65	17·24
Salisbury	2·63	31·09	18·51
North Adelaide	2·89	33·65	22·37
Adelaide	2·73	29·79	21·08
Glenelg	2·20	24·30	18·45
Brighton	2·17	27·21	21·37
Mitcham	3·45	35·34	24·26
Glen Osmond	2·78	39·17	25·94
Magill	2·56	40·09	25·35

RAINFALL—*continued.*

Station.	For Dec., 1923.	To end Dec., 1923.	Av'ge. Annual Rainfall
Mount Lofty Ranges.			
Teatree Gully.....	1·74	42·02	27·77
Stirling West	4·06	66·18	46·82
Uraidla	3·60	63·32	44·23
Clarendon	2·40	43·62	33·09
Morphett Vale ...	1 87	29·00	22·90
Noarlunga	1·54	27·66	20·41
Willunga	1·28	32·29	25·99
Aldinga	1·85	24·98	20·44
Myponga.....	2·55	35·25	29·80
Normanville	3 56	30·89	30·70
Yankalilla.....	3·26	31·96	23·31
Mount Pleasant ..	2 84	43·48	27·28
Birdwood	2 06	43·51	29·39
Gumeracha	2·34	51·71	33·36
Millbrook Reservoir	2·52	55·56	36·21
Tweedvale	3·12	54·72	35·65
Woodside	2·79	43·53	32·20
Ambleside.....	2·96	51·22	34·82
Nairne	3·24	36·24	28·44
Mount Barker	3·04	46·43	31·30
Echunga	3·41	48·34	33·06
Macclesfield	3·05	40·08	30 65
Meadows	4·30	51·29	36·19
Strathalbyn	2·17	24·70	19·36
Murray Flats and Valley.			
Meningie	1·81	23·91	18·74
Milang	2·12	16·19	15·45
Langhorne's Creek.	2·08	18·61	14·77
Wellington	1·96	17·18	14·80
Tailem Bend	1·88	18·42	14·68
Murray Bridge ...	1·82	15·31	13·94
Callington	2·19	18·48	15·49
Mannum	1·41	11·43	11·66
Palmer	1·78	18·01	15·46
Sedan	2·29	16·23	12·27
Swan Reach	1·03	10·48	11·06
Blanchetown	0·99	5·70	10·09
Eudunda.....	1·46	18·58	17·51
Sutherlands	1·47	13·02	11·20
Morgan	0·76	7·74	9·30
Waikerie	0·48	7·95	9·87
Overland Corner ..	1·66	7·59	11·03
Loxton	0·55	10·26	12·51
Renmark	0·88	8·60	11·06
Monash	3·04	11·33	—
West of Spencer's Gulf.			
Eucla.....	3·15	8·20	10·01
White Well.....	0·33	4·71	9·20
Fowler's Bay	0·58	12·42	12·14
Penong	2·41	14·72	12·53
Ceduna	0·95	10·31	10·25
Smoky Bay	1·43	13·30	10·98
Petina	1·81	15·72	12·95
Streaky Bay.....	1·49	16·59	18·07

Station.	For Dec., 1923.	To end Dec., 1923.	Av'ge. Annual Rainfall
West of Spencer's Gulf—*continued.*			
Talia	1·14	16·26	15·32
Port Elliston	2·03	20·65	16·56
Cummins	1·50	21·10	18·56
Port Lincoln	3·00	22·79	19·66
Tumby	2·19	15·58	14·56
Carrow	1·49	13·08	14·42
Arno Bay	0·98	12·16	13·06
Cowell	1·61	9·43	11·63
Minnipa.....	2·01	13·89	15·51
Yorke Peninsula.			
Wallaroo	1·29	16·20	14·15
Kadina	1·74	19·30	16·02
Moonta	0·87	17·48	15·35
Green's Plains	1·54	19·97	15·86
Maitland	0·54	26·50	20·17
Ardrossan	0·62	17·24	14·18
Port Victoria	1·06	20·95	15·50
Curramulka	1·31	22·18	18·20
Minlaton	1·86	24·75	17·90
Brentwood	1·31	20·03	15·83
Stansbury	1·21	23·94	17·01
Warooka	1·60	26·62	17·80
Yorketown	1·66	22·08	17·24
Edithburgh	1·63	22·74	16·58
South and South-East.			
Cape Borda.....	2·72	27·81	25·08
Kingscote	3·47	24·16	19·04
Penneshaw	3·04	20·10	19·47
Victor Harbor	1·98	22·43	21·49
Port Elliot	2·23	22·40	20·12
Goolwa	2·41	17·16	17·89
Pinnaroo	1·07	17·31	15·50
Parilla	1·91	18·22	14·51
Lameroo	1·93	20·98	16·32
Parrakie	2·01	18·58	14·58
Geranium	1·61	19·85	16·62
Peake	1·44	18·67	16·73
Cooke's Plains ...	1·63	20·76	15·14
Coomandook	1·39	17·94	17·49
Coonalpyn	1·99	21·39	17·40
Tintinara	1·46	23·21	18·70
Keith.....	1·45	20·94	18·22
Bordertown	1·60	22·61	19·39
Wolseley	2·13	24·80	18·12
Frances	2·84	26·71	19·73
Naracoorte	2·04	26·33	22·56
Penola	1·97	31·01	26·26
Lucindale	1·64	27·15	23·00
Kingston.....	1·90	25·57	24·51
Robe	2·16	25·93	24·69
Beachport.....	1·98	24·50	27·20
Millicent	2·40	35·22	29·39
Kalangadoo	1·91	38·71	32·47
Mount Gambier ..	2·52	33·88	31·29

AGRICULTURAL BUREAU REPORTS.

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Amyton	*	21	18
Angaston	*	—	—
Appila-Yarrowie	*	—	—
Arthurton	*	—	—
Ashbourne	*	—	—
Balaklava	596	12	9
Balhannah	621	18	15
Barmera	609	21	18
Beetaloo Valley	*	21	18
Belalie North	*	19	16
Berri	609	23	20
Big Swamp	598	—	—
Blackheath	621	25	22
Black Springs	590	—	—
Blackwood	*	21	18
Block E	*	—	—
Blyth	590	—	2
Booleroo Centre	*	18	15
Borrika	*	—	—
Brentwood	*	17	21
Brinkley	603	19	16
Bundaleer Springs	*	—	—
Bute	*	22	19
Butler	‡	—	—
Calca	*	—	—
Cadell	*	—	—
Canowie Belt	*	—	—
Carrow	603	16	20
Cherry Gardens	621	22	19
Clanfield	*	—	—
Clare	*	—	—
Clarendon	*	21	18
Claypan Bore	*	23	20
Cleve	*	16	20
Collie	*	—	—
Colton	*	25	29
Coomandook	*	16	20
Coonalpyn	‡	25	22
Cradock	*	—	—
Crystal Brook	*	19	15
Cungena	598	—	—
Currency Creek	610	R	22
Cygnet River	‡	17	21
Darke's Peak	*	—	—
Denial Bay	*	—	—
Edillilie	*	26	23
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Eurelia	590	—	—
Farrell's Flat	‡	—	—
Frances	*	R	23
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Hartley	*	—	—
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Hookina	‡	17	21
Inman Valley	*	—	—
Ironbank	*	19	16
Kadina	*	—	—
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Kalangadoo	624	12	9
Kangarilla	‡	18	22
Kanmantoo	*	19	16
Keith	*	—	—
Ki Ki	*	—	—
Kilkerran	596	17	21
Kimba	*	—	—
Kingston-on-Murray	*	—	—
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Koonibba	*	18	15
Koppio	*	21	18
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Lone Gum and Monash	*	16	20
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Longwood	‡	—	—
Loxton	*	—	—
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Lyndoch	‡	17	21
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MacGillivray	613, 621	R	19
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Mallala	*	21	18
Maltee	*	18	15
Mangalo	*	—	—
Mannanarie	588	—	—
Marama	609	R	R
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Moonta	*	R	15
Moorak	*	17	21
Moorlands	604	—	—
Moorook	‡	21	18
Morchard	621	R	16
Morphett Vale	621	R	21
Mount Barker	*	16	20
Mount Bryan	*	—	—
Mount Byran East	*	—	—
Mount Compass	*	—	—
Mount Gambier	‡	12	9
Mount Hope	600	R	16
Mount Pleasant	621	—	—
Mount Remarkable	*	—	—
Mount Schank	*	22	19
Mundalla	*	16	20
Murray Bridge	*	—	—
Mypolonga	610	16	20
Myponga	*	—	—
Myrla	*	19	16
Nantawarra	596	17	21
Naracoorte	624	12	9
Narridy	*	19	23
Narrung	*	19	23
Neeta	*	—	—
Nelshaby	*	19	16
Netherton	610	R	14
North Booborowie	588	R	R
North Bundaleer	*	—	—
Northfield	*	—	—
Nunkeri and Yurgo	*	6	3
O'Loughlin	*	16	20
Orroroo	‡	—	—
Owen	593	18	15
Parilla	605, 610	R	15
Parilla Well	*	21	18
Parrakie	*	—	—
Paruna	*	R	—
Paskeville	*	18	15
Pata	*	—	—
Penola	624	2	1
Petina	*	26	23
Pinnaroo	*	R	R
Pompoota	*	9	13
Poochera	603	—	2
Port Broughton	*	18	15
Port Elliot	*	16	20
Port Germein	*	26	23
Pygery	*	19	16
Ramco	‡	21	18
Rapid Bay	619	5	2
Redhill	*	—	—
Rendelsham	624	16	20
Renmark	606	17	21
Riverton	*	—	—
Riverton (Women's)	*	—	—
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Rockwood	*	21	18
Rosedale	*	—	—
Rosy Pine	*	—	—
Saddleworth	*	—	—
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Salisbury	*	1	5
Salt Creek	*	—	—
Sandalwood	*	—	—
Shoal Bay	621	—	—
Smoky Bay	*	—	—
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Stockport	*	—	—
Streaky Bay	603	—	—
Strathalbyn	620	22	19
Talia	*	14	11
Tantanoola	*	19	16
Taplan	*	22	19
Tarcowie	589	22	19
Tarlee	596	R	R
Tatiara	624	19	16
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Two Wells	*	—	—
Uraidla & Summertown	*	7	4
Veitch	*	—	—
Virginia	*	—	—
Waikerie	*	—	—
Wall	*	—	—
Wanbi	*	—	—
Warcowie	585	—	—
Watervale	*	—	—
Weavers	*	21	18
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Williamstown (Women's)	*	2	6
Williamstown	596	18	15
Willowie	*	16	20
Wilmington	*	16	20
Windsor	594	—	—
Winkie	*	—	—
Wirrabara	590	—	—
Wirrega	*	—	—
Wirrilla	‡	19	16
Wirrulla	601	—	—
Wolowa	*	—	—
Wookata	602	—	—
Wudinna	*	—	—
Wynarka	*	—	—
Yacka	*	22	19
Yadnarie	‡	R	19
Yallunda Flat	*	—	—
Yaninee	*	—	—
Yeelanna	*	19	16
Yongala Vale	*	—	—
Yorketown	*	—	—
Younghusband	*	24	21

* No report received during the month of December. ‡ Held over until next month. R. Recess.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

WARCOWIE (Average annual rainfall, 12.16in.).
November 21st.—Present: seven members.

MIXED FARMING.—The following paper was read by Mr. E. Jarvis:—"For mixed farming in this district I favor wheat and sheep. I consider that half of the crop should consist of Federation, because it is able to withstand the dry spells better than most varieties, but it is advisable to sow three or four different sorts of wheat. The same land should not be sown more than twice in succession. Fallowing should be commenced as early as possible, because the land usually sets very hard if left late in the season. Enough sheep should be kept on the fallow to keep the weeds from going to seed. Farming is not a very payable proposition without sheep. Farmers should rear the lambs and dispose of the surplus sheep, because in dealing there is a grave danger of introducing noxious weeds on to the farm. Cows pay very well during a few months of the year, but my opinion is that one could keep enough extra sheep to pay equally as well if a paddock were not reserved for cows. We should also be careful not to keep any more horses than are required." A good discussion followed.

WEPOWIE (Average annual rainfall, 13in. to 14 in.).
October 23rd.—Present: nine members and three visitors.

HAY AND HAY MAKING.—In the course of a paper dealing with this subject, Mr. T. F. Orrock said he had had considerable experience in growing varieties of wheat for hay, but he was of the opinion that the King's Early varieties, were the best, preferably King's Red. It was a good plan to sow the hay wheat first, which would enable that portion of the crop to be cut early, and the hay would be ready to cut before any oats that might be present had shaken out. Hay of a spendid quality could be obtained by sowing a few acres of oats and then mixing the oaten sheaves in the stack with the wheaten hay. Hay should never be carted until it had been cut at least 14 days. With the exercise of a little care in the handling of the binder, sheaves of an even and fair size could be made. When the binder was being worked the platform should be about 6in. lower in front than at the back, in order to give the driver more clearance over stones. It also had the effect of making all the butts of the stalks keep tightly against the front of the binder whilst they were passing through the elevators. The butter should be set back towards the knotter at a fair angle, thus tightening the butt and making an almost square and firm sheaf, with one side a little longer than the other. The tail board should be kept firmly against the heads of the hay to prevent the machine making uneven sheaves. The sheaf carrier should be in good order and carry five sheaves to each row, to place the hay as conveniently as possible for stooking. In cutting a crop that was "down" badly and lying in the same direction that the machine was working, it was advisable to take a full cut and work the reel as far forward and as low as possible. In cutting an ordinary crop, the lower the cutting was done the better would be the butt of each sheaf. The stack should not be less than 6yds. wide, and the sheaves should

be placed with butts out through the stack. The outside row of sheaves should be placed tightly on edge, and each succeeding row of sheaves just touching the row which preceded it. If the outside row were placed with the longest side of the butt of the sheaf upwards, the wall of the stack would be given a gradual outwards slope. The middle of the stack should always be 2ft. or 3ft. higher than the sides. Before a start was made to form the roof, the centre of the stack should be raised 5ft. or 6ft. higher than the walls, and then the roof could be finished off quickly without going to any unnecessary height. A keen discussion followed.

WEPOWIE (Average annual rainfall, 13in. to 14in.).
November 20th.—Present: 11 members and three visitors.

THE FARM VEGETABLE GARDEN.—The Hon. Secretary (Mr. W. J. F. Smith), in the course of a paper dealing with this subject, said the plot selected for the farm garden should contain about half an acre of good land, and be securely enclosed with a netting fence. It should be sheltered from the wind, and ploughed to a depth of about 10in. if the soil was not "clayey," but if there was a clay subsoil it was a good plan to cart loamy soil and old stable manure on to the plot and dig it into the soil. The land could then be cultivated again after the first rain, and worked down to a fine tilth. Before planting, another good dressing of stable manure should be applied, and dug into the soil. Almost all varieties of vegetables would grow in that district if given a little attention and plenty of water. Turnips, carrots, parsnips, and beetroot should be planted in May, in rows about 1ft. apart, so that they could easily be thinned out. Lettuce, cabbage, and cauliflower seed should be sown in a well-manured bed or box. Potatoes should be planted about June, in rows 2ft. apart, with 8in. or 9in. between each set. After the plants had been up about two or three weeks they should be well "earthed up." Onions should be planted about June in rows 2ft. apart, with 4in. or 5in. between each plant. He recommended Silver Skin and Brown Spanish as suitable varieties for that district. Peas should be planted in rows about 18in. apart, William Hurst being an excellent variety. Tomatoes required a fine and well-manured seed bed. They should be sown in July or August. Once the plants came through the soil they should be left uncovered, in order to make hardy growth. When the plants were ready for transplanting they should be placed in rows about 2½ft. apart, with 2ft. between the plants. For melons, trombones, cucumbers, &c., a hole about 2ft. deep and 3ft. in diameter should be made, and then filled with a mixture of stable manure and good soil. A bed of that size would hold about 12 seeds, and when they were ready to transplant, all the plants with the exception of three or four should be removed. These plants, especially cucumbers, required heavy waterings.

EURELIA, October 29th.—Messrs. Butterfield and Harvey (members of Parliament for the district) attended the meeting and delivered addresses.

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

GLADSTONE (Average annual rainfall, 16in.).
November 23rd.—Present: 17 members.

HORSE POWER ON THE FARM.—In the course of a paper dealing with this subject, Mr. C. H. Lines first referred to the claims made in favor of the tractor by some farmers. He considered the estimated cost of purchase and upkeep of an eight-horse team to be exaggerated. A good eight-horse team of three-year-olds could be purchased at an average price of £25 per head. It could safely be reckoned that the horses would have a working life of 12 years. The cost of harness would be about £5 per head and each set of chains 8s. A chaff cutting plant, costing £100, would last the life of two horses; repairs to harness, 7s. per head; and the price of 40 tons of hay in the stook and a few


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bags of barley should cover the expense of the horse team. Labor he had not considered, because that applied in the case of the tractor as well as the horses. On the above figures he thought that 200 acres of land could be worked for about 12s. per acre. If the horses were sold when 12 years old, they would bring in a few pounds, but after 12 years' work the tractor would be of very little value. Again, most farm laborers could manage a team of horses, but to drive and manage a tractor it would be necessary for the laborer to have some mechanical knowledge. In the discussion that followed, Mr. R. E. Lines said there was no doubt that to a certain extent the tractor had come to stay. During his recent trip to England he had found that a tractor which cost £230 in Australia could be purchased in the former country for £130, while a similar machine was to be had in the United States for £70. Mr. E. T. Hollitt was of the opinion that good points could be quoted in favor of the tractor, but he thought that even with the tractor, one would require a team of horses. Mr. Black said the fact that the tractor could be purchased in England for £100 less than in Australia was to a great extent responsible for its popularity in the former country. The Chairman (Mr. L. J. Sargent) then presented Mr. J. H. Sargent with a Life Membership Certificate of the Agricultural Bureau.

MANNANARIE.

October 25th.—Present: 15 members and visitors.

HAY MAKING.—In the course of a paper dealing with this subject, Mr. W. D. Cambell said before a start was made with cutting the hay the binder should be overhauled and placed in good working order. After the first two rounds with the binder the sheaves should be thrown back, and then stooking could be commenced. If wet weather were experienced, the stooks should be made three sheaves wide and not too long, so that air would be able to circulate through the sheaves. Carting should be commenced after the sheaves had been in the stook for eight to 10 days, and the foundation of the haystack should consist of old straw or rubbish to protect the bottom sheaves. There were different methods of building, but the stack with round ends had a very neat appearance when completed. Care should be taken not to allow the ends to become too low. The centre of the stack should not be made too full before the roof was started, and if an extra layer of sheaves were put on it would keep the stack watertight. Sheaves placed butts out made a solid roof, and if the heads were placed outwards, practically all the rain would be kept out of the stack after it had set down. The ends of the stack should face in an easterly and westerly direction, with the opening on the eastern end, because most of the rain came from the west. If oats were cut for hay it was not advisable to cut the crop on the green side.

NORTH BOOBOROWIE (Average annual rainfall, 16.35in.).

October 23rd.—Present: eight members.

THE BLOWFLY PEST.—In the course of a paper dealing with this subject, Mr. B. C. Mannion said the blowfly pest was one of the greatest curses of the Australian sheep industry. The experienced sheepman was able to detect a blown sheep in the flock, because the animal stamped its feet and twitched its tail as it stood in the yard. The flies attacked all classes of sheep, and deposited their eggs on any part of the sheep's body. To keep the flock immune from the pest throughout the year, repeated crutching and the application of approved preventives was necessary. There were many effective solutions on the market, but he expressed preference for bluestone, because it was an inexpensive and a very effective remedy. When the solution was applied to the sheep, it killed the maggots and dried up the wool so that no attraction was left for the fly to blow the sheep again. Bluestone also healed the places where the maggots were embedded in the flesh, and gave immunity for a considerable length of time. The solution was best made with just enough bluestone to color the water. Before any solution was used, the sheep should be crutched and the wool clipped as close to the skin as possible, in order to give the solution a chance to work immediately. If a sheep that had been blown was not attended to, it would soon become low in condition, and in many cases die.

SHEEP FOR THE SMALL LAND HOLDER.—Mr. F. Clark, who read a short paper dealing with this subject, said the time was fast approaching when it would be necessary for the small farmer to devote some of his time to raising other forms of produce than wheat, and he considered sheep to be the most profitable side line. Although their district was recognised as one of the best Merino sheepbreeding districts in the State, he did not think the best returns would be obtained from a flock that was kept with wool production as the main object. For the fat lamb trade he recommended crossbred ewes which carried a strain of Dorset Horn blood. Lambs from such ewes would be ready for market considerably earlier than the Merinos, and they would not be so troublesome, if it became necessary to resort to hand feeding.

TARCOWIE (Average annual rainfall, about 15½in.).

November 20th.—Present: 19 members and nine visitors.

CONVENIENCES FOR THE FARM HOUSEWIFE.—The following paper was read by Mr. O. W. Davidson:—"Every farmer should have the house equipped with as many conveniences as possible to lessen the tiresome duties of the womenfolk. The most convenient and comfortable house would be one under one roof, with large, lofty rooms, and a verandah all around. It would then be much cooler during the summer and warmer in the winter. Wire doors on the outside doors and wire screens on the windows are necessary to keep out flies. The kitchen, being the workshop of the housewife, should be the room with the most conveniences, and made as cool as possible in summer. A fairly large room, with plenty of ventilation, is preferable, and, if possible, one which faces the south or west. If the walls of the kitchen are painted to a height of about 4ft. it would need very little work to keep them clean and neat. In the *Agricultural Journal* one member at Cleve suggested tiling the walls for that height with white tiles. This would be a splendid idea, only that tiles are rather expensive, and the paint would wash almost as easily as the tiles. A 'built-in' stove assists in the cooking, and the stove retains the heat for a long period. A good plan for throwing light on to the top of the stove is to build a window in the outside wall of the chimney, just about a foot or so above the top of the stove. The laying on of water to the kitchen can easily be carried out by having a tank raised on to a stand, and a pipe put through the wall, with a tap inside in the most convenient place. This saves a great deal of time and labor. Other conveniences for the kitchen are cupboards for the saucepans, &c., and shelves with hooks underneath on which to hang the articles used for cooking and washing-up. The bathroom is a necessity, and even when there is only an underground tank it is not impossible for water to be laid on to the bathroom. A small galvanized-iron tank on a high stand connected with the underground tank by a pipe, and water pumped into it by a force pump, will provide water for both shower and bath-heater. Then there are conveniences which can be put into the washhouse. Water can be laid on, and taps put above the washtroughs. A washing machine can be installed, and if there is a sufficient supply and pressure of water available, a water wheel can be used to drive the washing machine. A dairy is also a necessity on a farm, to enable the housewife to keep cream, butter, eggs, meat, &c., cool and fresh with very little trouble. To make a cool dairy it is a good plan to build a concrete roof and then put an iron one about 6in. above it. The iron roof would preserve the dairy by running the water away from the walls during the wet weather and keep the heat out in the summer. The cowshed should be built away from the other buildings, but not too far from the house. I would have it open to the east, and one or two doors in the western side to allow for thorough airing. The time is not very distant when a country home will not be called complete unless it has a power installation for doing the washing, separating, ironing, and lighting appliances, and be connected with the telephone. If the man on the land endeavored to provide such conveniences as those mentioned in the paper, the drudgery of the housewife would be lessened, and a very important point in arresting the drift of the rural population to the city would have been made."

A further meeting was held on November 16th, when Mr. Lines gave an interesting account of a recent trip he had made to England.

WIRRABARA (Average annual rainfall, 18.91in.).

November 1st.—Present: 14 members and visitors.

TANNING SMALL SKINS.—The following paper, entitled, "Tanning Small Skins," was contributed by Mr. C. H. Curnow:—"In the first place, the farmer should obtain a small quantity of black wattle bark and chop it into small pieces. All the fat and flesh should be removed from the skins. Next, a barrel or wooden vessel should be secured, and the first pelt placed into the barrel with the fur side downwards. Then a layer of bark should be sprinkled over the flesh side of the skin. Another skin can then be placed in the barrel, special care being taken that the flesh sides of any of the skins do not come into contact with one another. In about three days the skins should be examined and another effort made to remove any flesh or fat that has not been taken off in the first operation. The skins should then be returned to the barrel with a layer of bark between each skin. The skins should be inspected every three or four days for a fortnight, and then once a week until they are tanned, which will take about two or three months, according to the size of the skin. In order to ascertain if the skins are tanned, the edge of the pelt should be cut with a knife, and if a white streak shows on the cut edge, it can be taken as an indication that the tan has not soaked right through the pelt and the skin will have to be returned to the barrel. When thoroughly tanned the skins should be tacked on an old door or some other wide, flat piece of timber, and dressed with as much neatsfoot oil as they will absorb. They can then be placed in a cool place, out of the weather, until they become thoroughly dry. A piece of brick can then be used to smooth off the skin. If the skin that is to be tanned is required for leather, it should first be soaked in a weak solution of slaked lime and water to remove the hair. When the hair has been removed, the skin can then be placed in the tan liquor and treated in the same manner as other skins."

BLYTH, November 3rd.—The meeting was devoted to a discussion of a scheme proposed by the Branch to inaugurate a seed wheat competition. A committee of management was appointed, and a set of rules governing the competition was compiled. It was also decided to award a trophy, valued at £2 2s., to the best single variety of wheat entered in the competition.

LAURA, November 23rd.—Mr. J. J. Aughey, who read a paper on the subject, "Co-operation," first referred to the advantages of co-operation in the direction of purchase of farm requisites and the disposal of primary produce. He also referred to the difficulties that had been experienced during the present hay harvest in housing the crops, and considered that the inauguration of a co-operative scheme for housing the hay would have been a step in the right direction. He suggested the following plan:—If four farmers, each cutting about 50 tons of hay, were to join forces and place the hay into two stacks, it would be possible, with a little judgment to complete hay carting without getting a stack damaged with rain. He would much rather have the hay out in the paddock when it rained than in a half-built stack, because hay that has been wet in the stack was never so good, no matter how it was dried. In parts of New South Wales stacks which can be completed in one day were built. The above would be co-operation in a practical form, and might lead to something better.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BLACK SPRINGS.

October 2nd.—Present: 17 members.

Mr. K. Dunn read a paper in which he gave an account of the Whyte-Yarcowie tractor trial. The report of the delegates to the Annual Congress was also received and discussed.

A further meeting was held on October 22nd, when Mr. J. Howard read a paper, "Topdressing Pastures with Superphosphate."

FARRELL'S FLAT.

November 23rd.—Present: 15 members.

VALUE OF HAY AND CEREALS AS FEED FOR SHEEP.—The following paper was read by Mr. R. Bartholomeus:—"Hand feeding of sheep is resorted to in times of drought, or perhaps during the autumn and winter months, to promote a rapid and unrestricted growth of the stock, when the natural feed is backward and early fodder crops are not making headway. In this district hay generally consists of either wheat or oats; barley and rye as a rule only being used in those districts where wheat and oats cannot be depended upon. Rye hay compares very favorably with wheat and oats as a fodder, but the crop must be cut early, which means sacrificing the yield per acre to secure a palatable hay with a high co-efficient of digestibility. Barley hay is also relatively rich in nutrients if cut in the milky stage—in fact, it is almost equal to oaten hay; but, unfortunately, it has weak thin-walled straws, which dry out and readily break down to dust when handled. The barley beard is a particularly heavy one, and is regarded as an objection by most people. Wheaten and oaten hay form the most suitable fodder of the cereal hays, and are a sufficient ration for the maintenance of sheep during times of drought. From tables dealing with the nutrients contained in both these crops it is found that oaten hay is the most valuable as a sheep fodder. Oaten hay also encourages milk secretion, and is therefore a good ration for lambing ewes. The method of feeding cereal hay will depend on the conditions in which a farmer is placed. Chaff is the most economical and convenient form, but if a man is so situated that he is not able to cut the hay, there is only one alternative—feed long hay. The objection to this practice is that the sheep will first eat off the heads, and damage the straw, thereby rendering it useless as a fodder.

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As a maintenance ration, wheaten or oaten chaff will doubtless supply the cheapest form of fodder. From feeding trials made in Western Australia it was found that 1lb. per day was sufficient to maintain a dry ewe in good health, and that ¾lb. of oats proved inadequate as a substitute for chaff in the absence of roughage to make up bulk; but on a stubble field this amount sufficed even for ewes heavy in lamb. The obvious deduction is that when dry feed is wanting, chaff must be fed, and that for pregnant ewes, a combination of chaff and grain is required. Cereal grains are the chief source of concentrated foodstuffs used on the farm. They are composed largely of starch and albuminoids, and they present their nutritive components in an easily digested form. They contain from 8 per cent. to 10 per cent. of 'flesh formers' or albuminoids. The percentage of digestible carbohydrate which is largely present in the form of starch ranges from 45 per cent. in oats to over 60 per cent. in wheat and rye. Oats are relatively rich in fats, whilst the others are distinctly poor in this valuable ingredient. It is the presence of so much fat in oats that causes overheating when fed liberally to stock in warm weather. The naked grains have a higher starch value than oats or barley, and the difference will vary according to the thickness of the covering husks. From observation it has been found that an oaten ration will give rise to larger, healthier, and stronger lambs, and may be fed to lambs at the rate of ¼lb. per day at four to six weeks old, and then steadily increased till the allowance reaches about ¾lb. per day. Barley is the next best in value to oats as a lamb food, and wheat is a little inferior to barley. Either of these, however, can be fed advantageously if combined with oats, or with oats and bran, to the extent of half the ration. With lambs, as with most stock, a varied diet is more effective than any single fodder. Where lamb fattening is conducted on a large scale, the general practice is to combine several fodders, such as oats, bran, maize, crushed barley, and oil cake, with a view to tempting the appetite and hastening development. Rye grain is similar in composition to wheat, and it ranks about equal with barley for meat production, but it is not available to us in any quantity, and the value put upon it as seed for early green feed places it beyond the reach of the stock feeder. Apart from the grains, there are a number of by-products of grains which have a great value as a sheep fodder. Bran and pollard added to chaffed oaten or wheaten straw makes a very satisfactory maintenance ration."

LIGHT'S PASS.

November 22nd.—Present: 19 members.

QUESTION BOX.—The meeting took the form of a Question Box. The first question to be considered was, "Does it pay to summer prune apricots?" The general opinion of the meeting was that summer pruning of apricots was a payable proposition. Mr. B. Boehm quoted instances of the results of summer pruning in his orchard and the increased crop that had been obtained from trees that had been summer pruned. Summer pruning, it was also asserted, assisted in checking black-bud. (2) "Is it advisable to graft apricots on to plum stock?" Mr. Robin cited the case of his own garden, where just as good a crop was obtained from apricots on plum stock as from those on any other stock. He said that the plum stocks produced profitable crops in wet ground. (3)"The use of the tractor for the orchard and vineyard?" Opinions differed on this question, some members speaking in favor of the tractor, whilst others condemned it, but the majority were of the opinion that as yet the tractor was too expensive for a gardener with a small holding, and too unwieldy in the small orchards and vineyards characteristic of the Light's Pass district. (4) "What killed so many apricots this year—moisture in the air or in the ground?" Members were unanimous in the assertion that the excessive flooding of the gardens by continual rain drowned the trees. (5) "Is it advisable to use a spreader with arsenate of lead sprays, and is soap the best agent for the purpose?" The opinion was expressed that it was advisable to use a spreader, but not soap, because it was too expensive. Casein answered the purpose just as well, and could be obtained from firms selling sprays. (6) "Can anything be done to combat the starling pest?" One suggestion was to fix a poll tax on starlings, and ask the district council to give so much a head for each bird. Another suggestion was to catch the birds in their roosting places and destroy them. (7) "What cereal would you recommend sowing as a hay crop in this district?" Mr. F. W. Boehm, supported

by Messrs. E. Polst and S. Ellis, said that a mixture of oats and wheat was the best crop, and advised cutting when the crop showed a greenish yellow color. (8) "Which is the better way to cincture four-year-old currant vines strongly grown; should just a ring be cut, or a piece taken right out of the stem?" The general opinion was that if the vines were strongly grown it would not hurt them to cut a piece out; but care should be taken not to cut the wood of the vine

LONE PINE.

October 22nd.—Present: 18 members two visitors.

GRAZING.—Mr. J. H. Warnest read a paper. He separated grazing into two divisions, viz., general and special. "General grazing is allowing the cattle to run at large on ordinary pasture with no immediate view to fattening for sale, but for keeping them comfortably alive and also for breeding purposes other than stud, and depasturing cattle on special soil, growing grass or herbage of particular value for the purpose of "topping up" cattle, or for providing an exceptionally robust constitution for young and especially stud stock. Here the selection of country rich in limestone assists in strengthening the bone; and ironstone country gives richness to the blood," the paper read:—"There are two main factors which should always be considered by the man on the land. Horses and cattle in particular need limestone right from infancy, and should be allowed to graze on such country wherever possible until two years old. With horses it is preferable to leave them three years before removing them to soil of a different nature. In reference to sheep, it is desirable to have lambs reared on limestone land until they are 12 months old. If this can be done, the meat becomes much sweeter and a better constitution is built up. When the soil contains a liberal supply of both limestone and ironstone, then it is best adapted for every kind of grazing, especially to the second division. In grazing one has to consider the nature of the country for the different types of cattle. For instance, Hereford cattle are a very hardy type, and therefore would be most suitable to hilly country or country subject to drought. Shorthorn cattle do not grow to maturity so easily as Herefords, but are on the average bigger and more evenly stocked with meat, especially in the hind quarters. Sheep need careful attention, and the country on which they are to remain for some time should not be too sandy, because that seriously affects the wool. In considering land suitable for grazing, it is desirable to secure the best obtainable whenever possible, and with plenty of running water. In conclusion, it is desirable for anyone who goes in for grazing to procure the best kind of stock, and not those of a mongrel breed." An interesting discussion followed.

OWEN.

November 23rd.—Present: eight members.

HAY MAKING.—The first work in the preparation of the hay harvest, said Mr. T. A. Freebairn, in a paper dealing with the subject of "Hay Making," was to overhaul thoroughly the binder, and place it in good working order before it was taken into the field. The stage at which the hay should be cut was a debatable point, but the speaker was of the opinion that best results would be obtained if the crop were cut about two weeks after the flower of the wheat had dropped, and the grain was beginning to set in the head. Oats, however, should not be cut until they were almost ripe. Stooking should be carried out as soon as possible after binding, the sheaves being left in the stook for about 10 or 14 days before being carted into the stack. No time should be lost in completing the stack, because the wheat harvest followed very quickly, and if the stack had to be left uncompleted, there was a great danger of rain damaging the hay. In the discussion that followed, Mr. A. J. Freebairn favored adjusting the machine so that it would make large sheaves to save twine and time in handling. He also considered that with large sheaves the hay retained a good color. Mr. W. Marshman recommended the following varieties of wheat for hay:—Late varieties: Zealand and Blue, Leak's Rustproof, and White Tuscan. Early varieties; King's White, Sultan, and Felix. He though the sheaves should be left in the stook for at least 17 days before being carted into the stack. Mr. H. Bowyer favored Algerian oats for hay. That variety was hardy and disease resistant.

WINDSOR.

September 25.—Present: seven members.

FARM BUILDING.—The following paper was read by Mr. A. Carter:—"In writing on this subject I will try to give my idea of what is necessary for the comfortable and efficient handling of a farm in this district. Wheat growing and mixed farming are the lines of agriculture conducted, and the essential buildings are:—Stable, chaff shed, implement shed, barn, cow shed, pig sty, and fowl house. The cheapest and best building for the stable is one built of stone with a galvanized iron roof. This building should be about 100yds. from the dwelling, and should face the east. It should consist of a chaff house and hay shed under a gable roof, with a skillion roof over the stable. This will provide for a greater height for the chaff house and hay shed, but the stable should be at least 8ft. high on the low side. If this building is 60ft. long it will accommodate all the horses necessary for the working of a farm say, 500 to 800 acres. The manger should consist of flat galvanized iron built on a wooden frame, and should run the full length of the stable, with an opening in the centre through which a man can pass. A strong loose box should be erected at one end with a gate so hung as to make a crush pen, when opened inwards. A passage at least 4ft. wide should be left between the back wall of the stable and the manger, and the chaff house should open on to this with a door at least 4ft. wide. The chaff shed should be large enough to hold 5 tons of chaff, and should have a second door opening on the western side into the hay yard. The remaining space at the rear of the stable can be utilised for the engine house and hay shed. The stack yard at the back of the chaff house should be large enough to permit a trolly and team to drive around, and be able to hold a stack of about 50 tons of hay. It is not advisable to put more hay in this yard than will be required for one year. The yard can be kept cleaner and clearer of mice if the hay is used each year. The implement shed should be built of stone and roofed with iron, and made large enough to hold all the farm implements and machinery, with room for a forge at the southern end. This building should have a gable roof, should face the east, and be built on to the stable, but standing about 40ft. in front, so that the end wall of the implement shed affords a shelter for the horses in the stable yard. The back wall should be provided with a doorway about 5ft. from the northern end. This end of the shed can also be used as a shearing shed, and with the aid of hurdles made of stringy bark battens, and two boards about 6ft. and 8ft., a fairly convenient shearing shed can be fitted up, and one that can easily be taken down and stacked against the wall of the shed while not in use. The back wall of the implement shed and the end of the stable will form two sides of a convenient sheep yard. The other two sides can be made of cyclone wire with barbed wire on the top, and a gate in the southern end. This yard should be subdivided into three smaller yards with a drafting race and small convenient gates from one yard into another. A mouse-proof barn can be built of galvanized iron, either on piles or dwarf walls. If the barn is built on piles with a piece of flat galvanized iron placed over the top of the piles below the floor joists, the mice can be kept out more effectively. The barn should be at least 15ft. x 30ft. in size, and built off the ground to a convenient height for trucking seed or super on or off the wagon or trolly. The cowshed can be built of galvanized iron, and should contain three or four bails with manger for chaff, and a race 3ft. wide for convenient feeding. This shed should have a concrete floor built up about 2ins. higher in front than at the back to allow for drainage. The pig sty should be built of stone with an iron roof. This should comprise at least three pens. The back and end walls should be built solidly of stone with a solid post and rail fence in front. The floor should be made of cement concrete, well built up to allow for drainage. The styes can be kept cleaner if an adjoining run of about one-quarter of an acre is provided. Fowl houses can be erected of galvanized iron and facing the north, with portion of the front enclosed for roosting accommodation for the fowls. They should be enclosed with 6ft. wire netting to keep out foxes." In the discussion that followed, Mr. H. Clark said high land was essential for drainage. Good sheds increased the value of a property, and in the event of a sale the land usually realised the value of the sheds. The stable and implement shed should be some distance apart, owing to the danger of fire. The fowl yard should consist of about one acre of land, and include the haystack if possible, the stable, and a small piece of natural scrub. The birds derived a

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great benefit from the hay and stable yard. Water laid on the the pig sty and fowl yard would be the means of saving a great deal of labor. Mr. H. White agreed that the fowl yards should include the stable and haystack, but steps should be taken to exclude the birds from the implement shed. The floor of the implement shed should be as level as possible, because the machines, if left standing the whole year in an uneven position, were liable to become twisted. Mr. H. Clark considered that iron roofs were too hot for the pigsties unless the houses were roofed with straw as well. Mr. A. Carter said where stone was used for the sties, the pigs could not become a nuisance by rooting, and with an iron roof the sty was kept dry, thus avoiding a disagreeable quagmire. The barn, to be mouse proof, should be separated from all other buildings. Mr. W. Tonkin advocated a gable roof for the implement shed. Portion of front of the shed should be enclosed. All sheds for stock should face the east.

BALAKLAVA, September 3rd.—The meeting was held in the Halbury Institute. Eight members and 32 visitors were present. The subject for the evening, "Stripper *versus* Harvester," as introduced by Messrs. Tuck and Rundle. A keen interest was taken in the remarks of the speakers, and a good discussion followed, in which Messrs. F. Webb, A. McDonald, P. Roediger, H. Robertson, A. Anderson, W. Miller, A. Marrion, and D. McArthur took part.

LIGHT'S PASS, December 20th.—Mr. J. G. Stolz delivered an address, in which he recounted some of his experiences during a recent trip through Central Australia.

NANTAWARRA, October 11th.—Mr. A. F. Herbert initiated a discussion on the subject, "Horse Power *versus* Tractor." The trend of the discussion centred on to the working life of a horse, which was generally agreed to be about six years.

TARLEE, October 15th.—Twenty-two members and five visitors attended the October meeting of the Branch, when the Agricultural Chemist at the Roseworthy Agricultural College (Mr. A. T. Jefferies, B.Sc.) was present, and delivered an address, "The Importance of Chemistry in Agriculture."

TARLEE, November 2nd.—The Superintendent of Experimental Works (Mr. W. J. Spafford) attended the meeting and delivered an address, "Wheat Culture," to an audience of 22 members and two visitors.

WILLIAMSTOWN, November 23rd.—Mr. J. H. Finnis (Secretary of the Advisory Board of Agriculture) attended the meeting and delivered an address, "The Work of the Department of Agriculture." Mr. S. B. Opie (Field Officer of the Department) was also present, and gave a short address, "Tobacco Culture in South Australia."

YORKE PENINSULA DISTRICT.

(TO BUTE.)

MOONTA.

MOONTA (Average annual rainfall, 15.22in.).

October 26th.—Present: 18 members and one visitor.

Dr. A. K. Clayton attended the meeting and addressed the members on "Mendel's Laws," and illustrated his remarks with blackboard illustrations. Several questions were then asked by the members, and answered satisfactorily by Dr. Clayton.

KILKERRAN.

October 23rd.—Present: nine members and three visitors.

THE FARM GARDEN.—In the course of a short paper dealing with this subject, Mr. B. L. Koch said apart from the fact that the laying out and management of a good farm garden assisted in keeping down the expenses on the holding, a

well-kept plot of land devoted to vegetable culture also added to the appearance of the homestead. He suggested that land of a sandy nature should be selected for the garden, and consideration given to the convenience of the water supply. All rubbish should be removed from the plot, and the soil worked to a depth of at least 4in. Next, the land should be given a thorough watering, and after being left in a rough condition for two or three weeks, it should be worked down to a fine tilth. The plot should be laid out in beds in order to facilitate weeding and watering. In the discussion that followed, Mr. T. Keightly mentioned that superphosphate was not a suitable manure for cabbages and cauliflowers, but it could be used with excellent results on peas. Mr. Koch preferred superphosphate to stable manure, on account of the large number of weed seeds that were brought to the soil with the latter.

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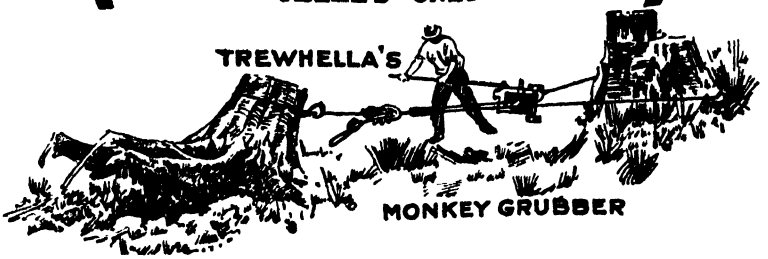
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WESTERN DISTRICT.

BIG SWAMP.

October 25th.—Present: seven members and two visitors.

RABBIT DESTRUCTION.—In the course of a paper dealing with this subject, one of the members said the whole question of rabbit destruction could be summed up in a few words, "catch them and kill them," but the question which confronted the landholder was how to do the work cheaply and effectively. In the wheat-growing areas pollard baits distributed with the poison cart around each burrow, or by hand, gave very good results, especially when the work was followed up by filling in the burrows. Such work, however, should be repeated each day for about a fortnight. Another plan when first filling in the burrows, was to scatter baits close to the filled-in holes, so that the rabbits when scratching would pick up the baits. A more simple method could be used on grass land. Three or four horses should be hooked to a three-furrow plough with an eight or 10ft. length of chain. By that means the team could be driven around the worst part of the burrow, and the plough pulled through the land as deeply as possible. A few baits should then be scattered along the furrow. After using the plough there would be plenty of loose dirt to fill in whatever holes the rabbits opened. Jam mixed with strychnine was also effective, especially if placed around the fence on sticks or stones after the holes had been blocked up. The fumigator, with a smoke mixture attachment, would also destroy a lot of rabbits. During recent years the use of petrol fumes from the exhaust of an engine had given good results. Some farmers were reported to be using motor cars for the same purpose. If the farmer carried out any of the above methods, it would be concluded that their paddocks were clear of rabbits, but, during the spring time, young rabbits were seen outside the paddocks, and where 1½in. netting was used many of the burrows were opened again before the completion of harvest, and the same work had to be repeated. One way of avoiding that was to use 1½in. netting. The poison cart should also be driven around the fences just as the grass was drying off, and around any burrows near the fence. A very good method in plain country, and where farmers had not been able to secure wire netting, was to use the poison cart every three months around all the burrows, and also to roll up hand baits about the size of an egg, or smaller, and throw a few down each burrow. The destruction of rabbits on grazing land was more difficult than on cultivated land. The most effective way of dealing with the pests on such land was the use of the poison cart, which, if used with judgment at different times of the year, would keep the rabbits in check. Good effective work could be done during the summer months after showers of rain, and again when the first seasonable rains fell before the green grass appeared. The poison cart would also do effective work during July or August, and again later when the grass was drying off.

CUNGENA.

October 24th.—Present: 18 members and three visitors.

FALLOWING.—In the course of a paper dealing with this subject, Mr. E. T. Barrett stated that the purpose of fallowing was to store moisture in the soil and destroy weeds. Fallowing should be commenced in June and finished, if possible, by August. The writer contended that it was a waste of time to fallow the land when grass was in seed, because that would cause the weeds to be more troublesome. The best plan was to turn in the weeds when they were young. Before starting fallowing the plough should be set to cut the ground and expose all the roots of the weeds to the air. The writer advised ploughing first to a depth of 5in., then working the surface soil to a depth of 2in., care being taken not to disturb the underneath soil. An implement such as a set of harrows or a cultivator should be used for that work. The best time to work the fallow was when the land was wet, and, if possible, it should be cultivated after every rain. Seeding should not be commenced on the fallow until after the first winter rain. All fallow land should be worked in the opposite direction to the first ploughing. A general discussion followed.

MIXED FARMING.—Mr. O. H. Gerschwortz, in a paper dealing with this subject, contended that it was first of all necessary to grow a rotation of crops on new land. Three or four crops of wheat could be grown, and then a crop of oats or barley, to give the soil a rest. The last-named two cereals provided better grazing for stock the following year. Oats were also a means of checking take-all, and oaten stubble would burn much better than wheaten stubble. On a farm of, say, 1,500 acres, one should carry about 300 sheep and a few cattle, as well as pigs and poultry. The farm should be well fenced and subdivided, provision being made for a good supply of water. The farm could then be used to the best advantage by sowing, say, 400 acres of wheat, 100 acres of oats, and 100 acres of barley. These crops should be sown early in the season and used for grazing the sheep and other stock during the early winter months, when other feed was scarce. In the spring of the year when feed became more plentiful, these crops could be left for harvesting. About 400 to 500 acres should be fallowed as soon as seeding was completed, leaving 400 to 500 acres for grazing purposes. If a larger number of stock were to be carried, it was a good plan to sow about 50 acres of rape on the fallow, to help carry the sheep through the summer months, and it would also serve as a good dressing for the fallow. Sheep on the farm were a profitable investment, because they provided meat and wool. On an average 300 sheep would return from 8s. to 10s. per head for wool, and if a few lambs were bred, say about 100, they could be sold or retained, and that number of aged ewes drafted out and sold. The best breed of sheep for wool production for that



district was the Merino, but for the owner breeding for lambs the writer recommended the Border Leicester or Shropshire crossed with the Merino. Sheep could also be run on the fallow to consolidate the soil, destroy weeds, and save labor in cultivation. A few cows were also necessary on the farm, first to provide milk and butter for the household, and secondly, for the weekly payments obtained for cream. If one were short-handed, however, it was only advisable to keep one or two cows. The writer next referred to pigs as a very useful asset, because they could be fed on the waste products of the farm. Pigs were useful for supplying meat for household use, or they could be marketed from time to time. In concluding, the writer referred to poultry as being a valuable side-line. The birds kept the household supplied with eggs, and were useful for table purposes, but the writer did not recommend the keeping of geese, turkeys, and ducks, because foxes were so numerous in that district. A general discussion followed.

GREEN PATCH (Average annual rainfall, 26.56in.).

November 26th.—Present: eight members and two visitors.

FODDER CROPS.—In the course of a discussion on this subject, members were unanimously of the opinion that if early feed was desired, it was advisable to sow oats at the rate of 1 bushel of seed and 1cwt. of super immediately after the wheat crop had been harvested. The only working of that soil that was necessary was to run a spring-tooth cultivator over the wheat stubble before sowing the oats. In reply to a question from Mr. Schwerdt regarding the best method of feeding sheep during the winter months, Mr. E. Sage said sheep could be hand fed with straw, and do well; but immediately the new growth of green grass made an appearance, it was advisable to feed the sheep on good hay chaff which could be set out in small boxes or bag mangers. Mr. Schwerdt mentioned that he had found a mixture of rye and oats an excellent grazing crop for sheep.

MILTALIE (Average annual rainfall, 14.55in.).

September 16th.—Present: eight members and three visitors.

FARM MACHINERY.—Mr. D. P. Bagnell contributed a paper on this subject. The makers of present-day machinery, he said, deserved great credit for its class, size, and durability. A few years ago, farmers were content with a four or five furrow plough, a 11 or 13 row drill, or a 4½ft. or 5ft. stripper, but at the present time there was a tendency to scrap the small implements because there was little or no sale for them, and labor was expensive. When the larger machinery came on the market, it was questioned whether it would possess the durability that was needed. The first makes of some classes of machinery were not up to the standard, but the Australian firms had an advantage over the oversea firms because they understood the various classes of soil, climate, etc. He did not favor most of the oversea makers' implements, because they did not possess the durability of the locally manufactured article. Mr. Bagnell then outlined the advantages and disadvantages of the different makes of ploughs, combined drill and cultivators, binders, strippers, harvesters, and reaper threshers. Continuing, he said there were many makes of engines suitable for the farm, but he thought that in time they would be supplanted by tractors, which were gradually making their way into the farming areas. For a farmer commencing operations, he would advise buying a heavy and powerful type of tractor, because it would not then be necessary to purchase horses, harness and a stationary engine, etc. A good discussion followed the reading of the paper.

MOUNT HOPE.

November 17th.—Present: 17 members.

MACHINE v. BLADE SHEARING.—The first homestead meeting of the Branch held during the year 1923 took place at Mr. F. Myers's residence on November 17th. After the garden and outbuildings had been inspected, tea was provided by Mrs. Myers. The meeting was continued in the evening, when the following paper dealing with the subject, "Machine *v.* Blade Shearing," was read by Mr. J. Doudle:—"With the class of Merino that is bred in this district, I think the machine, in skilled hands, is capable of taking off half to three-quarters of a pound more wool than the blades, and, apart from this advantage, the machine

can be used with more safety both to the man and the sheep, because when the blades are used, even by very careful men, a serious accident can happen through the sheep getting its foot in the bows of the shears and dragging them through the shearer's hand. There is also a danger of the shearer stabbing his pen mate, because most blade shearers now use 'Yabbereh' shears. It is easier for a young man to learn shearing with the machine than the blades. Any farmer that has an engine and, say, 1,000 sheep, will find that if he installs a shearing machine the outfit will be paid for in two years by the extra wool that will be obtained." In the discussion that followed Mr. R. Myers doubted the advisability of installing a machine in a small shed. Mr. H. Myers was convinced that blade shearing was better for the sheep than the machine.

WHEAT MOST SUITABLE FOR THE DISTRICT.—In the course of a short paper dealing with this subject, Mr. T. Speed, sen., expressed the opinion that Federation was the best wheat to grow for grain in that district. It stood up well, and was easily thrashed. King's Red was also a good yielding variety, but it was very hard wheat to reap and thrash. Marshall's No. 3 he considered to be the best hay wheat. Gluyas was another good variety, but it had a tendency to "go down" if rough weather was experienced. Leak's Rustproof, whilst being a good yielder, was very subject to blight. A short discussion followed.

WIRRULLA.

September 22nd.—Present: 15 members and six visitors.

QUESTION BOX.—The meeting took the form of a "Question Box," the first subject brought forward was:—"At what period should an oaten crop be cut for hay?" Members agreed that the crop should be cut when the grain was ripe. "The best plain to adopt to kill small mallee shoots?" Members considered fire the best method of coping with shoots. "Is it advisable to sprinkle salt on hay when stacking the sheaves?" All members agreed that it was. "What is the best means to prevent the ravages of white ants in house timber, sheds, posts,

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etc.?'' Mr. R. D. Burke recommended putting salt around the posts when they were erected. Mr. W. A. Mudge stated that he had checked the pest with the use of bluestone. Others recommended spraying with a solution of arsenic. ''What is the quickest and best way of reaping and cleaning 300 acres of crop yielding 15 bushels per acre?'' Members were divided in their opinions, some favoring strippers and winnowers; others, various styles of harvesters. In reply to a question regarding the best method of treating lampus in horses, Mr. B. Penna said he had found it a good plan to turn the affected horses on to green wheat. ''Does sowing wheat dry prevent smut?'' Members considered that in the event of smut in the crop it was advisable to pickle. ''Which is the best wheat to cut for hay?'' Members advocated Florence, Felix, or Gluyas. ''Is it advisable to bleach new cornsacks?'' Some members were in favor of the suggestion, whilst others spoke against it.

WOOKATA.

November 24th.—Present: 13 members and two visitors.

STACK BUILDING.—Mr. J. H. Murray read the following paper:—''One of the first points that required consideration prior to building the stack is to see that the hay frame is sound and firmly fixed to the wagon. It is also advisable to see that the hay forks are in good order, because nothing is more annoying than to have to pitch hay with a loose headed fork. Regarding the stack, the first thing to consider is the site. This should be situated as closely to the stables as possible, at the same time leaving sufficient room to approach the stack on all sides with a load of hay. Having made a rough estimate of the quantity of hay to be stacked, the four corners of the stack can be pegged, care being taken to have the sides and ends the same length and the corners square, otherwise it will be found that the stack will settle down unevenly. Next, the piece of pegged ground should be covered with dunnage, such as old timber, logs, scrub brush, and straw; but I prefer large stones, because they make a good solid foundation. The first layer in the stack is the foundation, and care must be taken to see that this is put down firmly and evenly, otherwise it will lead to subsequent trouble. First make a start on the outside row, which is the wall, by placing the sheaves butts out on their edge, and proceed around the stack to the starting point, carefully pressing every sheaf down firmly with the knee to make the wall solid. Now proceed to fill the middle. Continue as with the wall, but reverse the sheaves, with the heads just covering the binds of the wall sheaves. Place all centre sheaves on the flat, and continue this operation until the centre is completed, taking care to keep the middle well filled, because that is most necessary to run out the water, should any find its way into the stack. The second row is continued as with the first, but in the opposite direction to the one directly underneath. To obtain a straight wall the wall sheaves should be placed about 2in. to 3in. inside of the layer underneath, when it will be noticed that by the time the middle is filled they will have been pushed out level with the layer underneath. To obtain a wall with a steep slope out at the top, all that is necessary is to place the wall sheaves level with the last layer. This, however, should not be done unless long hay is being handled. Continue layer after layer until the top of the wall is reached. Now proceed to put on the eaves and the roof. The eaves first, by placing the sheaves on the flat, about 3in. to 4in. over the sides of the wall, right around the stack. Then fill the middle to at least 3ft. higher than the eaves. The roof is the most important work, and a little extra time and care taken is time well spent. Start by placing the first layer butts out on the flat of the sheaf, well covering the binds of the eaves, and working in the opposite direction to that in which the eaves were formed. Now fill the centre as before, carefully pressing every sheaf in the roof down firmly. Continue on until near the ridge, and if during the stacking some of the short sheaves have been put aside, they will come in handy to finish off the ridge. A good plan is to peg down the ridge, because these sheaves seem to always get out of place. Now that the stack has been finished, I advise thatching; failing that, I would cover the stack with a good layer of clean straw and peg it down with string, or cover it with old netting, to keep it from blowing off. This can be rolled up a little at a time when required.''

CARROW, November 23rd.—A large number of members and visitors attended the concluding meeting of the year, which took the form of a social evening.

GREEN PATCH, October 22nd.—Mr. E. M. Sage read a paper, "Results of Cropping," in which he gave an account of various tests that he had conducted on his farm. Mr. C. J. Whillas then gave a report of the proceedings of the Minnipa Conference.

LAKE WANGARY, November 5th.—The Assistant Wool Instructor of the School of Mines (Mr. C. A. Goddard) attended the meeting, and delivered an address, "Classification of the Farmer's Woolclip." Practical wool-classing demonstrations were also given at Messrs. Morgan's and Hawke's sheds.

McLACHLAN, November 3rd.—Mr. T. Puckridge read a paper, "Fallowing and Its Benefits." The speaker dealt with the subject from the point of view of the stimulating effect the breaking up of the land had on the activity of soil bacteria, and the making available of food suitable for the wheat plant. An interesting discussion followed.

McLACHLAN, December 1st.—Mr. G. P. Roe delivered an address, "Heavy *v.* Light Harvesting Machinery," and a keen discussion followed. The question of commencing crop and fallow competitions was also brought before the meeting.

MILTALIE, November 17th.—The report of the committee of management of the local crop competitions was received. The report showed that the judging was carried out by two local farmers, and so far as could be gathered every satisfaction was given on all sides. There were 15 entries, and six competitors' crops were judged. Mr. C. C. Wake, of Elbow Hill, won highest honors, with 78 out of 100 points. Two members of this Branch secured second and third prizes.

POOCHERA, December 8th.—Ten members and three visitors attended the inaugural meeting of the Poochera Branch of the Agricultural Bureau, which was held in the local hall on December 8th. The Manager of the Minnipa Experimental Farm was present and delivered an address.

STREAKY BAY, November 10th.—The subject, "The Advantages of Membership of the Agricultural Bureau," was brought before the meeting, and an interesting discussion ensued.

EASTERN DISTRICT.

BRINKLEY.

October 25th.—Present: 16 members.

ROTATION OF CROPS.—The monthly meeting of the branch was held at Mr. E. W. Pearsons' homestead. During the afternoon members were afforded an opportunity of inspecting the crops, stock, and farm buildings, special interest being taken in the manurial experimental plots being carried out under Mr. Pearsons' supervision. Mr. R. H. Lammey also gave a demonstration with a farm tractor. Mr. A. W. Richards, who contributed a paper dealing with the subject, "Rotation of Crops," said owing to the high prices of all farm implements, labor, &c., and the prospects of lower prices ruling for wheat in the near future, it was necessary for farmers to try to increase the production of both crops and stock. The best method by which that could be done was to adopt a system of rotation of crops, which would mean increased production without reducing the fertility of the soil. He had no hesitation in saying that the better working of the land and the application of heavier dressings of fertilisers would have the desired effect. A good rotation would be bare fallow, wheat, followed by a crop of barley or oats. Wheat could safely be followed by one of those crops, or, if desired, peas could be sown on a portion of the stubble, and the land then thrown out for pasture. The stubble should be burnt, because the fire helped to sweeten the soil and check take-all. Next, the land should be ploughed to a depth of about 2in., and if peas were grown on portion of the stubble, pigs and sheep could be profitably fattened. The droppings from the stock, and the nitrogen stored in the soil by the peas, would enrich the land for the next crop, which should be one of the cereals. Peas should

not be sown on the same land two years in succession. Farmyard manure should not be applied to a crop, but should be spread over land that was to be fallowed. By adopting a system of rotation, they would be able to check the spread of plant diseases, especially take-all, and keep the land cleaner, and increase the stock-carrying capacity of the farm.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

October 20th.—Present: 19 members and three visitors.

POINTS FOR FARMERS.—Mr. W. Braendler, who read a paper under the heading, "Don't Forget," said the farmer should commence work at a reasonable hour in the morning, feed the horses, milk the cows, and then feed the separated milk to the pigs. Stock which was kept in the stable over night should be bedded down, and the horses before being harnessed should be thoroughly groomed. Feeding the horses with large quantities of raw oats should be avoided. Shelter should be provided in the paddocks for all stock. In arranging the teams for working in the field, due allowance should be made on the swings if a small horse were worked alongside a larger animal, and when carting on metal roads horses with tender feet should be given a spell. All machinery should be kept under cover, and oiled or greased at regular intervals. Fences should be kept in good repair. Prior to the commencement of fallowing, the plough should be examined, and the mouldboards set at the right angle to turn over the soil completely. The fallow should be cultivated when weeds made an appearance, and working the land after a fall of rain would assist in conserving moisture. Sheep should be crutched at least twice a year, and also dipped. If the standard of the flock was to be maintained or raised, the farmer should purchase the best ram with the means at his disposal. Rabbits were a source of constant trouble on the majority of farms; they destroyed valuable feed, and when poisoned provided a breeding place for blowflies. The speaker strongly advocated the use of the fumigator for rabbit destruction. The blacksmith's shop was a most necessary part of the equipment of every farm. It should contain an assortment of bolts, nuts, rivets, &c. Harness should be greased at regular intervals. It was a good plan to order the cornsacks for the coming harvest some little time beforehand. The household should be kept supplied with water and chopped firewood. The stables should be regularly cleaned out, and the poultry houses and pigsties disinfected. In conclusion, the speaker stated that members of the Bureau should not forget to attend regularly the meetings of the Branch, to take an active part in the work, and induce new members to join.

MOOROOK.

November 29th.—Present: 10 members.

QUESTION BOX.—The meeting took the form of a "Question Box." The first question brought forward for consideration was:—"Is lucerne growing between the rows of young vines detrimental to the vines?" It was considered that although the lucerne might check hot winds and drift, the benefits gained were more than counterbalanced by the loss of vigor of the vines in subsequent years. 2. "Is cultivating the furrows after watering as good as ploughing in?" After a good discussion it was decided that the best method would depend upon conditions. Should the ground be loose and friable to a greater depth than the botton of the furrows, the cultivator would do the work satisfactorily; but if the land had a tendency to "hard pan," then it was necessary to use the plough. 3. "Should a drying rack have an iron roof?" In the opinion of those present an iron roof was of no advantage to a rack in this district. Mr. S. Sanders had only experienced one very bad season, and in that instance the fruit under the iron roof suffered as much as that on the open rack, owing to the humid conditions. 4. "How much superphosphate should vines in full bearing receive annually?" It was thought that from 2cwts. to 3cwts. of super used in conjunction with other fertilisers and green manure would be sufficient to keep the vines in good heart; but super alone could not be relied upon to produce good crops. 5. "What is the best method of trellising Sultanas?" Though some growers obtained good results from the two-wire system, it was generally considered that the three wires on a flat trellis would produce the best crops. The bottom wire should be 2ft. 3in. from the ground, the second wire 6in. above that, and the top wire 9in. above the second. The vine should be trained on the middle wire, and some of

the canes depressed to the bottom wire. The top wire had only to support the summer growth. Mr. Gray was strongly in favor of that system, contending that it was not necessary to leave so many spurs as with the two-wire system, and also the vines showed a much better "burst".

PARILLA (Average annual rainfall, 16in. to 17in.).

October 19th.—Present: 11 members and visitors.

CARE OF HARNESS AND FARM MACHINERY.—Mr. J. A. Mann, who read a short paper dealing with this subject, said neglect of the harness resulted in the loss of a considerable sum of money on a farm where a large number of horses was worked. In the first place, a pound spent in oil for harness every year was money well spent. The leather would be preserved and its life of usefulness would be considerably lengthened by the dressing of oil. Another point was to have proper places in which to keep the harness under cover. Farm machinery required constant attention, if it was to be kept in proper repair. Every machine should be put in good working order before it was sent into the field. Seeding and harvesting were the two busiest periods of the year on the farm, and the farmers could not afford to lose any valuable time when the crops were ripe, therefore he should give all the machines a good overhauling. All worn-out parts should be replaced with new ones. The binder knives should be sharpened and the fingers removed if the edges were worn. By keeping the knife track well oiled and the knife free from any clogging material, the machine would run smoothly. It was a good plan to have a drum of water in the paddock and put water on the knife each time it was driven around the field. The harvester should receive special attention, particularly the comb and winnower. The comb should be closed if needed, so that it would strip the crop clean, and the winnower and elevator should be so regulated that they did not lose any grain.

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RENMARK.

October 25th.—Present: 30 members and four visitors.

ORCHARD AND VINEYARD SPRAYING.—The following paper was contributed by Mr. C. S. Ruston:—"The first spraying for codlin moth should take place as soon as the great majority of the flower petals have fallen. This should be followed by a second calyx spraying after an interval of about 10 days. The performance of these two calyx sprays at the correct time is of vital importance in the attempt to control the codlin moth, which, incidentally, is very much in evidence this year. Future sprayings in badly affected orchards should be given at intervals of two or three weeks. The majority of growers use arsenate of lead in paste form. The general proportion is 20galls. to 11b. I would, however, recommend that the strength be slightly increased, even up to 15 to 1. The quality of arsenate is determined by the suspension test, which means the length of time the minute particles remain suspended in water at a given strength. This depends on the fineness of the material used. The use of casein with arsenate of lead, as a spreader, is to be very highly recommended; the proportion the same as for Bordeaux mixture—5ozs. to 50galls. Casein used in stronger proportions, up to 8oz. or 10oz. to 50galls., has a good effect on red spider, its action being simply to stick him fast. *Combined Sprays for Pear Trees.*—It is quite safe to use Bordeaux mixture in conjunction with arsenate of lead where there is any sign of fusicladium. A combined arsenate and scalicide also is possible, though, as a general rule, the best time to spray for scale is just before the buds burst, when scalicides can be used at a much greater strength, and are much more effective. Care should be taken that no soap is used in any way in conjunction with either arsenate of lead or Bordeaux, nor should the Bordeaux be an ammoniacal solution of copper. Arsenate of lead requires a fine spray; red oil and nicotine a coarse one. *Vines.*—There are two main reasons for the use of copper sprays on vines—the one as a check for anthracnose, already established, and the other a purely preventive spray against downy mildew. The sprays used in both cases are identical; the variation comes only in the frequency of the application. Whilst in normal years two sprayings may be ample as a preventive, five may be necessary in the case of areas badly affected with anthracnose. *Bordeaux and Burgundy Mixtures.*—The generally adopted formula for Bordeaux is eight copper sulphate, four lime, and 40 water, and the solution should contain a slight excess of lime. This year, however, there have come on the market two makes of ready-made and mixed powders that simply require the addition of water, and they are ready for use. The French variety has been used in France for nearly 25 years, and is considered to be quite reliable both against anthracnose and downy mildew. In composition it seems to aproach very nearly our homemade Burgundy mixture, and evidently contains a spreader of some sort. I have found this spray a little liable to scorch, and on testing samples from two 56lb. tins found them both giving a lightly acid reaction. The use of casein with this mixture, though not strictly necessary, is well worth while. In dissolving the powder I have found it advisable not to do so in the vat, because there is a fair amount of gritty residue left in the bottom. Also, if added too quickly to water, or with insufficient stirring, it will go into insoluble lumps. I have also found it impossible to make the powder into a very concentrated solution; from ½lb. to ¾lb. of powder to a gallon of water is about the maximum—stronger than that it starts frothing. I have only noticed very slight scorching of young growth in sultanas, and none at all in the case of currants. The other powder now obtainable is made locally. The proportion necessary to use is much smaller than the French, and it is certainly much easier to handle, besides being less costly." The writer of the paper then read a lengthly communication from the manufacturers of these powders, and the paper continued:—"*Oidium.*—Sulphur may be added to Bordeaux mixture with quite satisfactory results. The quantity of sulphur used depends on its fineness, *i.e.*, the finer the sulphur the less required—from 7lbs. to 10lbs. of sulphur to 50galls. of spray. Mix as follows:—Make a casein solution. Take ½gall. and place it in a hand basin. Add the sulphur and mix with a rotary egg beater. The casein wets the sulphur much more readily than water will, besides having the effect of sticking the sulphur firmly on the vine. The disadvantages are that it requires greater agitation than a hand spray provides, and has a habit of accumulating in a solid mass at the bottom of the vat. To make the casein solution use 5ozs. casein, ½oz. caustic soda, ½gall. boiling water. This will be sufficient for 50galls. of Bordeaux mixture. As a remedy for a sudden outbreak of oidium, Mr. de Castella recommends a

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spraying of 1¼lbs. potash permanganate to 100galls. of water. This is instantaneous in its action, but not lasting, and should be followed by sulphur. Its value lies in not requiring any warmth before it takes effect. Oidium is the one form of vine fungi that does not require water in which to germinate the spores; humid air is sufficient. Lime sulphur, in the proportion of 10 to one applied to areas badly affected by oidium just before the bud bursts, should be very beneficial, and can be applied later at a much diluted strength (30 to 1) in cold, calm weather, but this should not be attempted with anything like high or even moderately high temperatures. It must be used with great caution. When using Bordeaux mixture, empty the spray completely once a day, and flush out. When spraying is finished for the time fill the vat with water, and pump water through all the hose and nozzles, thus preventing copper deposits on the interior of the pipes and hoses, which peel off when dry, and cause immediate chokes in the nozzles. It is important to renew discs as soon as the holes become worn, or if the spray becomes coarse, resulting in inefficiency and extravagance." The Paper Discussed. —Following the reading of the paper, Mr. Ruston, in reply to a question, said the indications were that the codlin moth would be bad this year, as he had seen a lot of eggs on the leaves. Mr. F. H. Basey said he was using a spray of one in 16 for his pear trees, and proposed spraying fortnightly if possible. He was using casein as a spreader, and his method was to mix 35ozs. of casein with 3½ozs. of caustic soda to 3½galls. of water, using 1gall. of the mixture to every 50galls. of spray. It was necessary to mix it very slowly. As to the spray discs, they should be renewed when the holes became worn, because the fineness of the spray was affected. He believed a number of growers were using glass discs, and understood they were very effective. Mr. H. R. Little had told him that his practice was to cover the hole with solder and drill a new hole. That made the disc practically everlasting. One of the most important things to consider in preparing a spray was the effective straining of the water and mixture into a vat. An excellent method had been devised by Mr. J. W. Johnson, who took a lubrication oil tin and cut the two ends out, soldering a gauze bottom on one end. A petrol tin was then opened sideways, and the oil tin soldered into the bottom. The water ran through that almost as fast as it could be poured or pumped in, and it made a handy and effective sieve. Mr. Weste asked what Mr. Ruston would recommend as the best treatment for an attack of odium—the dry sulphur or spray? Mr. Ruston said that sulphur could be used in Bordeaux mixture, or for a sudden outbreak 1¼lbs. permanganate of potash to 100galls. of water was most effective. He believed that black sulphur would have a good effect, but it was difficult to get. Mr. Olorenshaw said that he was using black sulphur at the present time; it was easily dissolved in water. Mr. Ruston thought that if that was so, it should be easily mixed with Bordeaux mixture. He understood that some years ago, while he was away from Renmark, a suggestion had been made that a levy should be struck to enable the Bureau to be associated with the Mildura Research Committee. That appeared to him to be an excellent suggestion, and he would like to know whether the matter could again be taken up. Mr. Basey said that at the time the suggestion was made the Bureau was unwilling, as they thought any necessary experiments or inquiries could be made at the Berri orchard. Mr. Crerar asked for advice on the best way of applying dry sulphur, on the ground or on the vine. Mr. Basey recommended that it should be shaken on to the vine, and some should be left on the crown; a certain quantity would, of course, reach the ground. Mr. Olorenshaw said he put sulphur on the vines, and in the ground too. He had a block that had once been eaten out with oidium, and since he started using plenty of sulphur there had been no further trace of it. The sulphur was well mixed with the soil, and on hot days his block was a mass of fumes. He thought the Berri orchard should prove the value of sulphur. Mr, Basey replied that Mr. Savage was anxious to receive suggestions whereby he might assist growers, and had agreed to test the ploughing in of sulphur, and the use of muriate of potash. He would warn them that dry sulphur should not be used during high temperatures.

WILKAWATT (Average annual rainfall, 16in. to 17in.).

September 21st.—Present: seven members.

Mr. F. R. Koch (Hon. Secretary) read a paper, "Most Suitable Implements for the District," and an interesting discussion followed.

HAY MAKING.—In the course of a paper dealing with this subject Mr. G. Oram said in that district oats should be relied upon to provide the horse feed. That was generally recognised, but the varieties usually grown—Cape or Algerian—ripened late in the season, and often the hay had to be left out in the paddock until the completion of the wheat harvest. Serious loss might result if those varieties made rank growth and were cut too early, because the hay would be bitter. Generally speaking, hay could be cut earlier on new ground than on old. Cape and Algerian oats could be cut with advantage even when nearly quite ripe, especially if fed as chaff. It was not advisable to commence cutting until about half the straw showed a purple color. He recommended the growing of earlier varieties, such as Scotch Grey, which could be cut on the green side, to supply, say, half the hay crop. The growing of earlier varieties should ensure getting the hay in before the wheat was ready for harvesting. The speaker expressed a preference for the round stook of about 24 sheaves, and the hay could be stooked so soon as the man on the binder had enough down to give the stooker a fair start. Some people preferred to leave the hay on the ground for a few days, but he did not see that there was any advantage in that practice, because hay properly stooked would "make" or dry out nicely and with good color. Rain had a very bad affect on hay, so that the sheaves should be stooked as soon as possible, and carted away without any delay after it was ready. It should be carted after being in the stooks eight of 10 days. A good, dry foundation should be made for the stack. Mallee roots would be suitable, as they would permit of a certain amount of air circulation. The use of old straw was not to be recommended, because it was liable to cause dampness to creep into the stack. He preferred building with the butts outwards all through the stack. The outside rows should be placed on edge, and the second row should just clip the heads of the outside sheaves. The next and succeeding rows should be placed out to the bands, which would keep the centre of the stack well raised. Care should be taken not to walk near the edge of the stack. Any loose hay should be raked off the edges on to the middle, and the same practice continued until the eaves were built. A roof built with the heads of the sheaves outwards would run the rain off better if no straw was used, but if the roof was continued with the butts outwards straw would keep on the roof, and the top of the stack would be better preserved than if built with the heads outwards.

On November 2nd members made a tour of inspection of the district, and visited the farms of Messrs. Koch, Philips, and Neville.

BARMERA, November 19th.—Mr. E. Muspratt (Irrigation Instructor and Inspector) attended the meeting and delivered an address, "Rack Building." On December 10th the Deputy Horticultural Instructor and Manager of the Berri Experimental Orchard (Mr. C. G. Savage) gave pruning demonstrations in the orchards of Messrs. H. Anthony and D. Brookes. In the evening Mr. Savage addressed the members on several subjects relating to "Block Management."

BERRI, December 4th.—A meeting of the Branch was held at the Government Orchard, on the above date, when there was an excellent attendance of members and visitors from neighboring Branches of the Bureau. A further meeting was held on December 5th. The Director of Agriculture (Professor Arthur J. Perkins) was present, and delivered an address, "Fertilisers and Soils." The Horticultural Instructor (Mr. George Quinn) was also present and dealt with the subject, "Export of Grapes."

GERANIUM, November 6th.—Mr. A. H. Robin, B.V.Sc. (Government Veterinary Officer) attended the meeting and delivered an address. On the following morning Mr. Robin gave a demonstration, "The Points of the Horse," and diagnosed the complaints of several animals brought forward for his inspection.

GLOSSOP, November 21st.—On November 21st 20 members and a large number of visitors met at Mr. Hatch's block and inspected the vineyard. Mr. C. G. Savage (Deputy Horticultural Instructor and Manager of the Berri Experimental Orchard) was present, and gave a demonstration of summer pruning and budding. In the evening Mr. Savage delivered an address, "Cultivation and Manures."

MARAMA, November 22nd.—Eighteen members and a large number of visitors, including several ladies, were present at the November meeting of the Branch, when the Assistant Dairy Expert (Mr. H. J. Apps) delivered an address and gave a demonstration of milk and cream testing.

MONARTO SOUTH, November 17th.—A paper from the *Journal of Agriculture*, "Economics on the Farm," was read by the Hon. Secretary (Mr. C. F. Altmann), and an interesting discussion ensued.

MYPOLONGA, November 19th.—On the afternoon of November 19th Mr. H. Wicks (member of the Advisory Board of Agriculture) gave a pruning demonstrations on the orchards of Messrs. Linke and Dowding. A meeting was also held on the evening of the 19th, when an address, "Citrus Culture," was given by Mr. Wicks.

NETHERTON.—On November 14th the Assistant Dairy Expert (Mr. H. J. Apps) attended a meeting of the above Branch, and delivered an address, "Dairying," to a gathering of 12 members and a large number of visitors.

PARILLA, September 21st.—A paper dealing with the subject "Fallowing" was read by the Hon. Secretary (Mr. C. S. Foall), and an interesting discussion ensued.

SOUTH AND HILLS DISTRICT.

CURRENCY CREEK.

October 26th.—Present: 11 members and visitors.

MILKING MACHINES.—In the course of a paper dealing with this subject, Mr. J. W. Pitt contended that the milking machine was one of the greatest time and labor-saving machines that had been introduced to the dairy farm, because it was used twice every day throughout the year, and thus it was different from the many other costly machines which were used for a few weeks, and then put into the shed until the next season. With a two-unit milking plant one man could milk 24 cows per hour and separate the milk at the same time, at a cost in petrol and oil of 4d. per hour. With a man and a boy and a larger plant, the number of cows per hour would be proportionately increased and the cost reduced. One difficulty with hand milking, apart from time and labor, and especially with hired labor, was to retain the same man year after year. That meant a change of methods, which militated against maximum results. Another point was that of sore teats, which with some cows were a great trouble. The difficulty of milking by hand a cow with a bad barb-wire cut on the teat was also known, but an injury of that nature caused very little trouble with the machine. The cows settled down to being milked by the machine from the very first and stood more quietly, rarely needing a leg-rope, and they were also cleaner in the bail, showing that they thoroughly appreciated the machine. The best time to set up a milking plant was before the cows came in. They should be put on the machine when in full milk, when they would respond better than if put on as strippers. The best results were obtained from heifers just in, for they often milked perfectly dry, thereby doing away entirely with stripping. It was most important that the milking machine should be kept thoroughly clean. A couple of gallons of warm water should be run through the machine directly it was taken off the cow. Once a day the cups should be dipped two or three times in hot or boiling water in which a piece of soda had been dissolved. All the milk tubes should be taken to pieces and washed in warm water and soda, and cleaned with the small brushes supplied for the purpose, care being taken to put the machine straight from the cow into the water. In the discussion which followed, Mr. Saltmarsh emphasised the importance of cleanliness as advised by Mr. Pitt. Mr. Ritchie favored machines as being cleaner than handmilking, especially the overhead system. In reply to a question, Mr. Pitt said he did not think soda injured the rubbers in any way.

CURRENCY CREEK.

September 21st.—Present: five members.

SHEARING AND PREPARING A SMALL CLIP.—The following paper was read by Mr. D. J. Gordon—"Shearing should commence at the start of the warm weather, before grass weeds begin to drop. Clean the shed thoroughly, and if it is not a permanent building with yards, erect hurdles for the pens that are required, seeing that the catching-pen is adjacent to the board and in the most convenient place for the shearers to catch the sheep. Have a pen in which to turn the sheep after they are shorn. It is a good plan to have a swing gate across the pen, just touching both sides of the entrance, so that whichever way the gate is pushed when

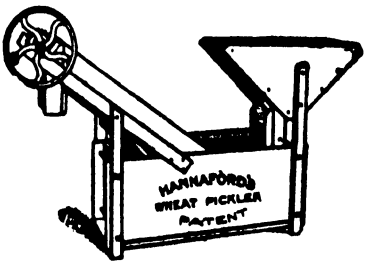
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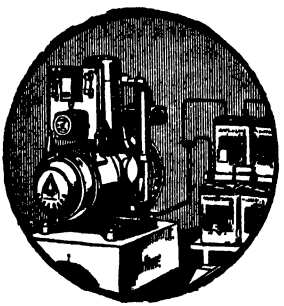
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the shearer has caught a sheep the gate will then close unaided, leaving the other pen open and a clear run for the shorn sheep. Ample provision should also be made for housing sheep in the event of rain. A sufficient number of hands should be engaged, so that the shearer has nothing to do but attend to shearing. Wool-picking and clearing up should be done by other hands. The farmer himself should be able to shear, because it is often very difficult to get shearers at just the right time, and in addition to that, the practical man will have a better idea of how his sheep should be shorn. The board should always be kept clean, the broom being freely used after each fleece has been picked up, so that no locks or second cuts may get into the next fleece. Second cuts must be avoided as much as possible, because they are practically valueless. The fleece should be picked up by taking hold of that portion of the wool that has been removed from the two hind legs or breech of the sheep, then with an inward scooping movement of both hands, the fleece should be ready for carrying to the table. To place it on the table it should be thrown outwards and slightly upwards, when the wool should spread over the table like a blanket, leaving the shorn side facing downwards. Skirting.—If the wool is clean and free from burrs, nothing more is needed than to take off the stained and sweaty edges. If, however, there are burry pieces they should be removed, but do not take off burry pieces at the edges and leave burrs on other parts of the fleece. If the fleece is badly affected with burrs, it is far better to pack the whole lot together and take the lesser price for burry wool. In rolling, the sides should be turned in, the one farthest from the operator slightly more than the other, and the fleece rolled from breech to shoulder. This will bring the best wool, that of the shoulder, uppermost. Class out any faulty fleeces, such as those consisting of extra short-stapled, fatty, tender, yellow, or discolored wool. It is a mistake to over-class a small clip, making it into 'star lots,' and thereby expecting to obtain a high price for one line. A good average price will pay the best. In baling the wool, see that the bales are as even in weight as possible, for, like all goods, the wool should be prepared in such a manner that it will please the eye of the buyer. In branding it is advisable to have proper lettering and neatly-branded bales. A distinctive brand shows the clip off to advantage. It is also important that the bales be branded on the top and front, leaving the bottom for the buyer's mark and the port of destination. If possible, avoid making mixed bales. It is better to send the oddments in bags for reclassing by the brokers. If mixing cannot be unavoided advise the broker of the number of bales and any enclosure, such as ram's wool, &c I would advise farmers to keep to the one kind of sheep, thereby making their parcel as large as possible and avoiding so many 'star' lots, which mean less money to the grower." In the discussion that followed, Mr. Shipway asked if the writer advised taking out the bellies when only a few were shorn. Mr. Gordon replied in the affirmative and said the bellies should be removed if only 20 sheep were handled. Mr. Fidock asked the measurements of a good rolling-table. Mr. Gordon advised:—"Eight feet long by 4ft. wide, with broom handles let in to holes bored through the sides, with sufficient room allowed between each to enable the handles to revolve."

LENSWOOD AND FOREST RANGE (Average annual rainfall, 35in. to 36in.). October 15th.—Present: 12 members.

EFFECTIVE SPRAYING.—The following paper was read by Mr. L. Green:—"For effective spraying it is necessary to have a pump that is capable of throwing a continuous spray at a strong pressure. The pump should always be kept in thorough working order, and ready to be used at any time. Through the winter the outfit should be thoroughly overhauled, and repairs attended to, and not left until the trees required spraying. The first spraying should be given when the first blooms opened. This spray should be applied as each variety of fruit reaches the stage just mentioned. Bluestone solutions have proved to be more effective when used at the blooming stage than other sprays, but care should be taken not to use too strong a mixture. Bluestone solutions should not be used after the bloom has fallen, for in most cases where it has been tried the cure has been as bad as the complaint. After the bloom has fallen, and before the eye of the apple has closed, a spraying of arsenate of lead and lime sulphur should be used. About a fortnight later, I favor spraying again with the same mixture, and then again early in December. The grower who sprays often, and keeps a

film on the fruit all through the season, has a far better chance of having clean fruit if the weather changes and sets in favorable for the development of scab, than the grower who has to wait for the weather to clear before he can spray. Towards the end of January a further spraying of lead should be applied. During an average season, no further spraying is needed, but if a dry summer and autumn are experienced a later spraying of lead will prove profitable on late ripening varieties. All spraying should be applied with a good continuous pressure. The sprayer should always aim at getting a fine misty spray. Care should always be taken in the mixing of sprays, and the work carried out according to the directions supplied by the makers." Mr. Lawrance then read a paper entitled, "Machinery in the Garden."

MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).

November 20th.—Present: eight members and vistors.

THE CROW PEST.—The monthly meeting of the Branch was held at Mr. A. J. Nicholls's homestead, when the following paper, dealing with the above subject, was read by Mr. A. Brumby:—"One of the worst pests of the man on the land on Kangaroo Island is the crow. This bird is very destructive at seeding time, because it unearths the seed after it is drilled in, and also pulls up the grain after it shoots, for the soft grain at the root. It is a source of worry at lambing time, and pecks the eyes out of the young lambs and ewes when they are down. The best way of destroying it that I have tried is by trapping. The trap is made as follows, and the cost is very small if poles are obtained from the scrub, in fact the only cost is the wire netting and a piece of No. 8 wire for securing the ends of the poles. Obtain four stout poles 7ft. 6in. long for the corners, point them and drive them 18in. in the ground, 8ft. apart, to form a square.

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Then bore a hole in the top of each upright, and brace four poles 9ft. long to the top of the corner posts with wire. Two of these poles act as wall plates on the ends, and two as roosts for the crows flying on to the trap. Then two poles are required, long enough to reach from the top of the corner post to the bottom of the opposite post, near the ground, which forms a triangle. Secure these poles by wire twitches, and the top and bottom of each upright, which holds the trap firmly in position. Two pieces of netting 3ft. x 1½in. mesh will cover the frame, each piece being 3¼ft. long. A ladder made of two poles 9ft. long is placed horizontally at the apex of the triangle. The ladder is composed of 10 rungs 9in. apart, five rungs on each end, and a distance of 18in. between the two rungs in the centre to provide for the entrance of the crows. Three rungs on each end should be covered with wire netting on the under side to keep the birds from escaping. Two roosts 9ft. long made of light poles should be placed 18in. above the apex of the triangle inside the trap, on to which the birds can fly. To bait the trap place a carcass of a sheep or lamb just below the opening in the centre of the apex of the triangle, and place the skin on the outside end of the trap for an attraction. The decoy crows should have both wings cut; about four decoys will be sufficient, and they should be well fed and watered. No dead crows should be left lying about. The traps should be built near trees or any place on the farm frequented by the birds. The best time to catch crows is in the winter and spring of the year, when they are hungry."

McLAREN FLAT.

October 26th.—Present: 58 members and two visitors.

THE CARE AND TREATMENT OF THE HORSE.—The following paper was read by Mr. L. Hussey:—"With horses as with all other stock, breeding is one of the most important points to consider, consequently I would rather advise a man to invest in three well-bred horses than five mongrels For utility, I prefer a medium, active draught, to a heavy Clydesdale or Shire horse, because feed and time will be saved, and one will obtain a maximum of efficiency with a minimum of cost. I consider that small feeds and often are far more beneficial than throwing in a bag of chaff to save a little trouble. Any horse can work well on five kerosine tins of chaff a day—one for breakfast, one for dinner, one for tea, and two for supper. I would add to his feed occasionally a little bran, and sometimes a few oats. If possible, lucerne should be fed in small quantities, more particularly as a medicine than as a fodder. It is necessary for a horse always to have water at its disposal; a running stream if possible, but, failing that, a good trough, supplied from a slightly brackish well. Before starting a long journey I greatly disfavor giving a horse a big drink, besides making it most uncomfortable it is apt to cause scouring. A horse should never be harnessed with the sweat of yesterday upon it; nothing is more conducive to sore shoulders and girth galls. Always brush the shoulders before adjusting the collar, and, if possible, bathe them with warm water. A horse needs one and a half hours for dinner, all the harness being removed. Always see that the harness fits properly. I am adverse to using chain traces, and much prefer the flat leather ones with links to fasten to the hames, and chains for the spreader or swing bar. I also advocate the open bridle. The housing of stock is a most important factor, and for our climate I favor brushwood walls with a thatched roof, and a strong wirenetting door to keep out the fowls. Always tie the team up during feed times, because some horses eat more quickly than others, and when they finish their own, drive the slower eaters away from their feed. The stables should be cleaned out every morning. I favor dry straw for bedding."

FRUIT CULTURE.—The following paper was contributed by the President of the Kangarilla Branch (Mr. R. G. Morphett):—"In dealing with this subject I propose to speak of apples, pears, apricots, peaches, and prunes. In preparing the orchard, lay it out the way the ground can best be worked, and plant the trees diagonally. This will give about 20 trees more to the acre when planted 20ft. by 20ft. than when planted on the square, and another advantage is that the full distance is obtained three ways between the rows, whereas on the square only two ways can be worked. Always secure the best varieties of trees from a firm upon whom you can depend, or, better still, select buds or grafts from trees that are good

bearers, and send them to the firm from you intend purchasing the trees, and have them budded with your own buds. It is not advisable to have too many varieties of the same sort of fruit, three or four at the most, and be sure to obtain the varieties that will suit your district. I suggest the following varieties:—Apples—Jonathan, Kind David, Dunn's Seedling (or Munro's Favorite), Cleopatra, Rome Beauty. Apricots—Late Moorpark, Royal. The Royal is a splendid canning variety. Pears—Duchess, Packer's Triumph, Beurre Bosc, Winter Nelis. Peaches—Freestone, white flesh—Brigg's Red May, Royal George, Sea Eagle, Mountain Rose; freestone, yellow flesh—Elberta, Salwey; clingstone, canning varieties—Simms, Pullar's, Liberty, Golden Queen. Prunes—D'Agen, Splendour, Prince Engelbert. In pruning apples, do not prune too hard when the trees are young. Only prune enough to keep the trees in shape; this will make them bear more quickly. Hard pruning means more growth and less fruit. When the trees are bearing, prune each tree the way you find you can get the best results. Cleopatras are subject to bitter pit, and very little pruning is necessary. Top the trees as little as possible, for with topping and heavy pruning there is always a danger of the fruit becoming affected with bitter pit. If the branches become too long they can be cut back to the main arm, and so assist the limbs in making a stout development, capable of bearing a good crop. Dunn's Seedling (or Munro's Favorite) should be well pruned in the centre and the top well cut back, for this variety has a tendency to make straight growth. The trees bear a large crop in alternate years, and for that reason should be pruned somewhat heavily to save the limbs from breaking and spoiling the shape of the tree. Rome Beauty is also inclined to make straight growth, and should be opened out in the centre even more than Dunn's Seedling, because the fruit does not ripen till late in the season. The pruning of Jonathan and King David differs somewhat from the other varieties. They need heavier pruning, the trees should be well topped, and the small limbs in the centre of the trees where the fruit buds are some distance apart should be spurred back to 3in. or 4in. in order to force the development of fruit buds. These two kinds are naturally open growing, and do not need much taken out of the centre of the tree. They are also rather small apples, and if not kept well pruned the fruit will be too small for sale, and will be borne on the end of the limbs. Apricots should be pruned soon after the fruit is picked, care being taken not to start too soon, otherwise they will probably make fresh growth, and spoil to a certain extent the forcing of the fruit bud. With summer pruning the top main leader should not be touched, but all water shoots should be removed, and the tree kept well open in the centre. The small limbs should not be pruned, or they will probably die. By pruning in the summer the orchardist is able to proceed with the winter ploughing without any loss of time. All that is necessary in the winter is to top the leaders that are left. Peach trees can be pruned on very much the same line as apricots, only that they should be treated somewhat more heavily. Pears usually make very straight growth, and for that reason it is necessary to keep the centre of the tree well opened out and cut back the long straight shoots. The small limbs in the centre should not be pruned too heavily except when they are too long and when the buds are a long way apart. The Duchess is one of the best varieties of pears for this district, and should only be pruned about every other year. Trees that are sickly and not making much growth should be pruned more heavily than the tree that is making strong growth. See that the secateurs and other tools are sharp and clean, and all cuts made close to the bud which is on the outside. This will induce the tree to make an outward growth, while by cutting close to the bud there will not be so much dead wood to cut out. Spraying as a branch of fruitgrowing is not recognised as it should be. The commercial orchardist knows the important part spraying plays in the ordinary routine of orchard work, but it is the owner of the small orchard who is so often neglectful. He may not dispose of his fruit as a commercial proposition, but merely grows sufficient for home requirements, and for this reason considers spraying is not at all necessary. Spraying, like most other essential things, requires the exercise of a little common sense. For instance, to spray a tree regardless of the main points of a particular disease or pest will probably result in loss of time and money, and the grower will condemn the spray, whereas in reality he is, perhaps, to blame himself. The pests of a fruit tree can be divided into two sections—fungi and insects. A fungus is a form of plant life. One form throws out roots which enter the tissues of the leaves and break down the

cells and utilise the sap, finally throwing out spores, by means of which the fungus is spread and carried on under suitable conditions. It is evident, therefore, that to cope with such a fungoid disease any treatment to be used must be applied before an entrance has been made into the tissues of the plant. The treatment is preventive, not curative. Spraying after the disease shows is no good, because the damage is done. Usually moisture and heat are required for the development of fungoid diseases, and the moisture they require is often their undoing, for at that time the moisture dissolves some of the spray material, and it is in this way that the spores are killed. Bordeaux and Burgundy are well-known remedies. Bordeaux consists of a mixture of bluestone, lime, and water. It is essential to the success of the spray that good quick lime be used; the lime is to prevent the burning of the foliage by the bluestone. In the Burgundy mixture soda is used in place of the lime. A fungicide should be applied in the late autumn, when the leaves have fallen. The wintering or resting spores, which are the reproductive cells of the disease, and then attacked, and for this reason a strong solution should be used. The next spraying should be given when the buds begin to swell, when normal strength material should be used. It may be necessary to spray again when the fruit has formed. Curl leaf of the peach and nectarine, and shot-hole and scab of the apricot, can be treated in the same way. Insects are of two kinds—chewing and sucking. The former eats the leaves, fruit, and shoots, and to effectively deal with them their food must be coated with a poison. Arsenate of lead is the most efficacious spray for the purpose. Codlin moth and cut worms belong to this class. The sucking insect is provided with a pointed hollow trunk, with which it pierces the tissues of the plant, and sucks the sap. Poison for this class of pest is no good; it must be destroyed by a spray or insecticide, which, coming into contact with the insect, burns its body or else covers its airholes and smothers it. Woolly aphis, peach aphis, and red spider come under this heading, and the most effective remedies are kerosene emulsion, red oil, resin wash, and lime sulphur. Codlin Moth.—The damage this insect does is well known to apple and pear growers. It is a chewing insect, and is readily treated by timely applications of arsenate of lead. The first spraying should be done as soon as the petals fall from the flowers, care being taken to see that the calyx end of the forming fruit is well filled with spray. A second spray is necessary a fortnight later, followed by a third as the fruit develops. Peach Aphis.—Spray as soon as you see them with kerosine emulsion or tobacco wash, and repeat the dose in a few days. Woolly Aphis.—The spray for this pest must be driven with force right on to the aphis by holding the nozzle close to the affected parts. The spray must go right through the woolly covering and on to the aphis to be effective. The sprays most effective are black leaf 40 and red oil. Red spider is another pest the orchardist has to fight. It not only attacks apples, but is very fond of prune trees. Red oil sprayed at the rate of 4galls. to 100galls. of water in August before the trees shoot, followed by another spraying with lime sulphur, 1½galls. to 100galls. water, when the trees are in flower or when the spiders are on the move, I find very effective, and keeps the pest well in check. Never spray when the weather is wet or too hot; always choose a cool still day if the best results are desired.''

McLAREN FLAT.

November 22nd.—Present: 60 members.

POULTRY.—The following paper was read by Mr. E. S. Bagshaw:—''I have been breeding Black Orpingtons for eight years, and ask for no better breed of poultry. They are hardy, and great foragers, and do as well confined as they do when run at large. They are a dual purpose fowl. After the second year they are worth 5s. per head for table purposes. When hatching and rearing, they are easy to handle, and a ready market is found for the cockerels. They come in to lay at five months to six months of age, if properly fed. I have had the one strain for eight years, and always go back to the man I first bought from for a fresh cockerel or hen for a change. One can keep breeding from the same pen for years, if eggs are set from different hens. Do not forget to feed the birds well. I hatched 36 pullets last season and they came into laying in March and April, and from the end of April I have averaged 28 to 32 eggs a day. I attribute their good laying to time of hatching and to good and regular feeding. My feeding consists of bran and pollard. Twice a week I add crushed

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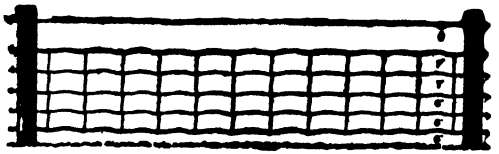


Fig. 7—Cyclone Special Spring Coil Sheep Fence.

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GENERAL MANAGER: F. W. STRACK, F.A.I.S., F.C.I.S. (Eng.).

charcoal to the morning mash; midday I throw in half a handful of wheat per hen, and at night time another feed of wheat. Another strong point in their favor is that when hatched in August, the pullets do not moult. One more factor in their favor is the color of the egg. If used for export, the brown egg is preferred. The ideal mating is a 10 months' to 12 months' old cockerel, mated to second season hens. If the hens are medium sized, use a cockerel a little larger. Be sure that the hens are fine boned and sleek in the head. Anything coarse and heavy will give very sluggish progeny. The same applies to the cockerel. One of the most important things in breeding poultry is the size of the egg. This year every egg I hatched weighed 2½ozs. or more. When I finish breeding I lock up the cockerels, so that all the eggs will be infertile. An infertile egg will keep for months, whereas a fertile egg will soon go stale. With good feeding and housing a flock of fowls should average 200 eggs per bird. I use incubators and any hen I can obtain for hatching. Do not feed the chickens until they are at least 48 hours old, and then only give them a little at a time. Always have gravel, shell grit, and finely ground charcoal on the floor of the brooder. Care must be taken to have shallow tins for drinking, otherwise some of the chicks will be drowned. Always round off the corners of the brooder, otherwise the chickens are apt to suffocate one another. Provide plenty of green feed. Three times a week I clean out the run, and each time cover the bottom with an inch of turf covered with natural grass."

THE CULTIVATION OF CURRANTS.—The following paper was read by Mr. F. B. Wilson:—"Currants are a product in which we are all interested, and form part of an important industry. It is, therefore, imperative that we should produce the very best article, which is so essential, if we are to compete successfully against the older countries of the world, where labor and living conditions are so much lower than they are in Australia. It is very necessary to produce a sample of rich, dark color, carrying all the bloom that it is possible to retain in the drying process, and to be even in size. It is impossible to secure a sample showing an attractive bloom off trays or out of a drying shed that has been filled with inferior or immature fruit, such as is usually gathered from badly, and, at times, uncultivated, vineyards. I do not say that it is always the cultivation that is responsible for poor and faulty fruit. There are times, and I am sorry to say they frequently occur, when bad pruning, performed by unskilled and inexperienced men, is to blame. This point cannot be too carefully observed. There is nothing that gives more trouble than a rough and dirty pruner. Summer pruning proves very beneficial both to the vines and the quality of the fruit at vintage time. It is necessary to manure the vines in order to obtain the best results. Different soils require different fertilisers. My experience in heavy land leads me to believe that in this class of soil we require something to keep the heavy clay soil loose, and I recommend a dressing of 1 ton of gypsum to the acre. I have found this is very beneficial; it renders the land easy to work, and assists the soil to retain moisture during the summer, which is so essential for developing and maturing the crop. This manure in itself is not sufficient. My experience has been that 4cwts. of bonedust to the acre every four years, and 4cwts. vine manure annually, with a dressing of gypsum every third year, has given really good results, and I have been able to produce samples that are very satisfactory from this method of fertilising. However, the determination of the best fertiliser to use is a question for the vigneron to decide. I am sure that the class of land above referred to requires something to cause it to relax, and it may possibly be a great benefit to dress with 1 ton per acre of gypsum alternate years, as well as the 4cwts. vine manure annually. The question of cost will naturally arise, and I admit that at first glance it appears to be high. Gypsum at £3 per ton represents a cost of 30s. per acre annually, and vine manure at £8 per ton, 32s. per acre plus carriage; 4cwts. bonedust every four years works out at 8s. per acre annually, making a total of £3 10s. per acre, plus carriage. This works out approximately at 10s. per ton, and adds to the above cost per acre accordingly. When, however, this is compared with the returns of a vineyard that has not been properly treated, it will be agreed that it pays to fertilise. On the one hand you obtain a return of about ½ a ton, and perhaps less, to the acre of poor-quality fruit, altogether unfit for export, a disgrace to the district in which it is grown, and bearing no recommendation to the grower; on the other hand you have a return of 1 ton and often 1½ tons to the acre of beautiful and fully matured fruit that is carrying that rich, glossy bloom which is required to enable

it to compete in the world's markets, and make the industry a success, both to the grower and the State. Viewing the facts in this light, you will easily see that it is a very profitable undertaking to manure judiciously. The cost per acre set out at £3 10s. for manure, plus carriage 10s. The value of ½ ton of fruit per acre, no manure, the currants valued at 4d. per lb. (approximately) off the trays through the buck sieve, £18 13s. 4d.; as against 1 ton off trays per acre at 4d. (approximately), equals £37 6s. 8d., showing a difference of £18 13s. 4d per acre, less cost of manure, £4, leaving a profit per acre of £14 13s. 4d. These figures are based on conservative lines, and do not allow for the possibility of inferior fruit from the unmanured vines. The time has arrived when it is absolutely imperative that we produce an article that will stand the tests that are being made (and rightly so) by the Government of the day. In the past, inferior products have been exported which soon undermined the industry, and to-day it is necessary to export an article that will redeem and uphold Australia's good name. The best results are secured when dressings of manure have been applied after the first ploughing. The heavy winter rains having then passed, the danger of losing the manure by washing is less. Weather conditions are certainly a very great factor in successful cultivation, and if favorable, make the work very much easier. After the first ploughing, the cultivator should be worked to keep the soil loose, and prevent it setting hard. In a wet season, I find it necessary to cultivate twice, and on some parts three times, between the first and second ploughing to keep the land in a fit condition. After the second ploughing, it is very necessary to work the soil to a fine surface, in order to conserve as much moisture as possible. After every summer rain the cultivator should be at work; in fact, there is always a job that will pay the grower—keep the cultivator continuously working. On a 40-acre holding this implement should never be idle during November and December. The grower that follows his cultivation on these lines will be amply repaid, and at vintage will have, under normal conditions, a sample of fruit of the first quality. On the other hand, the grower that does not attend to cultivation must be prepared to accept at least a one-crown drop on his fruit, which means at least ½d. per lb. This in itself represents a very substantial loss. On many occasions after the first ploughing the soil is allowed to harden without even being worked with the harrows to crumble the surface. This, in my opinion, is very disastrous to the cultivation of a vineyard. It is most essential to retain moisture in the viticulture industry, and if the land is left in its rough state after the first ploughing, and the season happens to come in dry, the so-much-coveted moisture soon disappears, and leaves the soil rough and hard. To overcome this trouble the cultivator should be brought into use after the harrows have crumbled the surface. If this is practised it will be found that when the second ploughing is started, the soil will turn up in a soft and loamy condition, which is very necessary if the moisture is to be retained. In a country like Australia, with the excellent conditions which we enjoy, it does not seem just that the people that help to produce the article should have to pay more than the price paid by people on the other side of the world. If our organisations can and do sell overseas at a price within the limits of the consumers' capacity to pay, then why should not the people of Australia be able to purchase their own grown products at the same price? This, I contend, has been one of the principal reasons that our consumption of fruit per head of the population of Australia has been so much lower than that of the Americans. Further, it should be the aim of the grower to supply the best-quality fruit for home markets as well as for export. It is a mistake to dump inferior fruit on the markets for home consumption. The fruit should be of excellent quality, and at the world's parity price, so that Australians could be encouraged to eat more fruit and help the fruit industry."

RAPID BAY.

November 10th.—Present: 17 members.

HAY AND HAY MAKING.—The following paper was read by the Hon. Secretary (Mr. A. J. Grundy):—"No hard and fast rule can be laid down as to the varieties which should be grown for hay, because some wheats which have proved a success in one district are not profitable in others. I have tried a fair number of varieties,

and for this district I recommend King's Early and Crossbred No. 53 (which is also known as Zealand Blue), because under ordinary conditions a profitable harvest is assured, and stock are very fond of the hay, and if fed to them long they will consume almost every straw, and keep in good condition. The grain should be pickled in a solution of 1lb. bluestone to 10galls. of water a few days prior to sowing, as a preventive of smut and other fungus diseases, and should be sown on fallowed ground free from weeds. One and a half bushels of Crossbred should be sown to the acre, but as King's Early is not a good stooling wheat 2bush. to the acre are required to ensure a thick crop. I also advise growers to use one bag of superphosphate to the acre, beause the heavier dressing of manures gives the best results. The crop should be rolled when the wheat is about 5in. or 6in. in height, in order to prepare a smooth surface for the binder, and enable the crop to be cut closer to the ground. The best time to cut hay for marketing purposes is about 10 days after the plants have flowered or when the grain is in the milky stage. This will assure a good color, which is most essential from a marketing standpoint. If, however, the hay is to be used for feeding on the farm, and a little grain is desired, the crop should not be cut until the grain in the head of the wheat can be felt to be 'firming off' when pressed between the thumb and finger. Oats grown for hay should not be cut until the heads are turning a golden color or when the grain is beginning to firm. It is a great mistake to cut oats too green, because they are inclined to be bitter, and stock did not care for them. The sheaves should be of medium size, and well tied to save waste in handling, and should be left lying in the sun one day before stooking, to obtain a nice green color and a sweet hay. To leave the hay for three or four days before stooking is a worse mistake than stooking close up to the binder, because if the sheaves are left lying about for any considerable time they become dry and brittle, and will not make good chaff. Round stooks should be made, consisting of between 30 sheaves to 40 sheaves, placed in an upright position, and if the stooking is properly done it is surprising what a lot of rain it will take to damage the hay. The hay should be fit to cart about a fortnight after cutting, but this, of course, depends largely on weather conditions. A good test is to take a sheaf from the centre of the stook and try to break it at the top joint, and if it breaks cleanly the hay is ready to go into the stack. A good bed of straw or timber should be placed as a foundation for the stack, otherise the bottom rows of hay will become musty and unfit for use. In building the stack the best way to place the sheaves is butts outwards, to prevent the stack from shifting. This, of course, only applies to the building so far as the set off for the roof is concerned, and from there onwards I favor placing the heads out, in order to turn off the rain. The middle of the stack should be kept well filled from the start, and when the eaves of the stack are made, the sheaves should be placed 5in. or 6in. further out than the other sheaves, in order to carry the water clear of the stack. When the eaves are made the middle of the stack should be filled 3ft. higher than the outside of the stack, until the stack is nearing completion, to prevent rain from getting into the middle of the stack. After the stack is completed, it is advisable to cover it as quickly and as thoroughly as possible. Some farmers make a practice of covering it with loose straw, but I favor thatching, because the extra expense is small, and less straw is required than if put on loose, and mice do less damage under thatch than under loose straw."

STRATHALBYN (Average annual rainfall, 19.28in.).

October 23rd.—Present: 20 members.

CALVING DIFFICULTIES.—In the course of an address, "Troubles of the Cow in Calving," Mr. T. Collett explained at length the irregular positions in which the calf was sometimes presented. When such a mal-presentation occurred, the calf was seldom delivered without assistance. An iron hook could sometimes be used to place the calf in the normal position for delivery. As a last resource, it was often necessary to remove the calf in pieces, care being taken to prevent any unnecessary cutting. Mr. W. J. Springbett said if assistance were rendered to the cow, a gentle yet firm downward pull should be exerted on the calf.

SHOAL BAY.

November 20th.—Present: 14 members and visitors.

FALLOWING.—Mr. C. Hall, who read a short paper dealing with this subject, expressed the opinion that every farmer should endeavor to put as large an area as possible under fallow, especially if there were indications of the season being a dry one. The work should be commenced early in the season to cause a good germination of weeds, which could be turned under before harvest. He favored working the land twice to a depth of 3in., and advised running sheep on the land to kill the weeds and improve the condition of the soil.

ALDINGA, November 28th.—The business for the evening was a paper contributed by Mr. M. Stone on the subject, "Poultry Keeping," A keen discussion followed the reading of the paper.

BALHANNAH, July 7th.—Mr. W. Rollbusch read a paper, "Herbs—Their Uses and Commercial Value," and an interesting discussion followed. Forty-three members were present at a further meeting held on August 24th, which took the form of a Question Box, when several subjects of local interest were brought forward for discussion.

BALHANNAH, November 20th.—A paper, "Herd Testing," was read by Mr. F. O. H. Martin, and an interesting discussion followed.

BLACKHEATH, November 23rd.—Mr. E. T. Pym read a paper from the *Journal of Agriculture*, "Tillage of the Soil." Several matters of local interest were brought forward, and an interesting discussion followed.

BLACKWOOD, November 19th.—Mr. W. A. Hamilton, M.P., attended the meeting, and delivered an address, in which he dealt with the advantages to be obtained from the applications of lime to orchard lands. The subject, "Spraying for Codlin Moth," was also discussed.

CHERRY GARDENS, November 30th.—Captain S. A. White, C.M.B.O.U., Vice-Chairman of the Advisory Board of Agriculture, attended the meeting, and delivered an address illustrated with lantern views, "The Economic Importance of Our Native Birds."

LENSWOOD AND FOREST RANGE, November 12th.—The monthly meeting took the form of a Question Box, when several subjects of local interest were brough forward, and an interesting discussion ensued.

MacGILLIVRAY, November 9th.—The monthly meeting of the Branch was held at Mr. R. Wheaton's homestead. A tour of inspection was made of the crops, stock, and farm buildings, after which the visitors were entertained at afternoon tea by Mrs. Wheaton.

MEADOWS, September 26th.—Mr. G. Connor, of the Kangarilla Branch, attended the meeting and read a paper, "Top-dressing Pastures." A further meeting of the Branch was held on October 24th, when the Government Poultry Expert (Mr. D. F. Laurie) was present and delivered an address, "Egg Production."

MORPHETT VALE, November 22nd—A homestead meeting was held on the above date at Messrs. Hunt Brothers' residence. A large number of members and visitors attended, and an interesting and instructive afternoon was spent in inspecting the working plant and crops. Afternoon tea was provided by Mesdames F., H., and E. Hunt.

MOUNT BARKER, November 21st.—Mr. S. Duffield delivered an address, "Experiences with the Divining Rod," to an audience of 39 members and four visitors.

MOUNT PLEASANT, November 9th.—Mr. C. O. Royal read a paper from *The Journal of Agriculture*, and an interesting discussion followed. A short talk followed, in which members dealt with the subject of wheat pickling. Mr. W. Vigar expressed the opinion that pickling on the floor was the best method to ensure a clean crop.

TWEEDVALE, November 28th.—The Orchard Instructor and Inspector for the Hills District (Mr. E. Leishmann) attended the meeting and delivered an address, "Diseases of Fruit Trees," to a gathering of nine members and nine visitors.

SOUTH-EAST DISTRICT.

ALLANDALE EAST.

November 23rd.—Present: seven members.

FENCING.—Mr. W. M. Laslett read the following paper on this subject:—"It is my intention to describe what, in my opinion, is the most economical fence, and, secondly, fences that will answer a dual purpose, such as sheep and vermin proof, and cattle and sheep proof. The style of fence I recommend is one 3ft. 7in. high, with three posts 5ft. 4in. long, and two droppers between each post, to the chain. The cost of droppers and posts per chain is about 4s., and that of the netting, tie wire, and No. 10 wire for tying the barb wire to the posts and droppers about 12s. per chain; three plain No. 8 galvanized wires and one 12-gauge barb, about 4s. 6d. per chain. This makes the total cost of material including strainers and stays, about 21s. per chain. It is necessary to peg the line first, and in doing so it is a great advantage to have a set of pegs of the same width painted white, near the top. Line the pegs from end to end, i.e., first place the two end pegs in position, and then place the other pegs in line. If it is possible to plough the trench for the netting do so, because this will save a good deal of labor, both in taking out and filling in the trench. Endeavor to erect the posts as the holes are sunk. A guide to the height of the fence can be made by marking the rammer 3ft. 7in. from the ground. To give the fence a neat appearance on the top it might be necessary to raise or drop a post an inch or two, accordingto the contour of the ground. When the posts are in position, and the strainers are erected about 6 chains apart and about 3in. higher out of the ground than the ordinary posts, boring is the next operation. A good boring gauge is one made of a piece of hop iron bent to hang level on the top of the posts, with notches cut indicating where the holes are to be bored. The posts should be bored with a ⅝in. bit, and the droppers with a ⅝in. bit. The position of the wires should be:—Barb on top of posts, and droppers fastened with No. 10 wire, plain wire 7in. from top, netting wire 12in. from top, thus allowing the netting to go 5in. into the ground, belly wire 28in. from the top. In staying strainers where permanent stays are required, mortise a hole in the strainer about midway between the netting and belly wires. Place the stay in position, and at the other end put in an ordinary post, ram it hard up to the stay, and put a wire around the strainer close to the ground, then strain tightly through the hole for the netting wire in the ordinary post. First strain and fasten the barb wire to the posts and droppers, and the plain wire nearest to the next, then two wires will keep the droppers in position. In straining wire, do not turn it short around the post, but give it another notch or so on the machine, and allow it to find its own turn when the plug is removed. When the netting is being rolled out, always start from the end that allows the operator to keep his left hand to the fence, and when about half a coil has been run out the slack can be pulled in with the hands and again at the end. Drop the next coil on the netting to hold the strain whilst fastening the wire. First tie the netting around the posts, then make three ties on the top wire and two on the belly wire between each panel. Fill in the trench, and the fence is completed. For cattle and sheep a very effective fence is one 3ft. 8in. high, composed of two barb and four plain wires, and at least six posts to the chain. Droppers can be used if preferred, but if used I recommend clinching to the wires with No. 10 wire to keep the wires strained tightly. The gauge of the fence is 3ft. 8in. high, barb wire on top tied with No. 10 wire, plain wire 9in. from the top barb, barb wire 7in. from the top and pulled through the posts, plain wire 25in. from the top, next wire 31in., and another 37in. from the top, leaving the bottom wire 7in. from the ground, making the space between each wire from the top to the bottom as follows:—9in., 8in., 8in., 6in., 6in., and 7in. between the bottom wire and the ground. To enable the barb wire to be pulled through the post it is necessary to bore the holes with a 1¼in. or 1⅜in. bit, and then run a plain wire through the holes. Run out the barb wire along the next strain, and tie a piece of wood (not too heavy) to the end to keep it from coiling up, and attach the barb to the plain wire with a knot that will easily pull through the holes. Fasten the other end to the axle of the cart or to a swingletree, and drive the horse along, when the barb will follow through the holes. Any ordinary light horse will pull through six or even 10 chains of wire without any trouble, but I advise straining most of the other wires before pulling in the barb, taking care to strain and tie the top barb to keep the posts in position. This type of fence will keep all classes of stock securely enclosed.

KALANGADOO WOMEN'S (Average annual rainfall, 33in. to 34in.).

November 10th.—Present: 10 members and one visitor.

Mrs. Campbell contributed a paper on the care and feeding of cows and calves, which was followed by a good discussion. The question arose, "Should the newly-born calf be taken away from its mother, or left with her for three or four days?" Some members favored the latter practice, whilst others were of the opinion that the cow and calf fretted more, and it did them more harm than if they were separated the first day.

MILLICENT (Average annual rainfall, 29.25in.).

November 3rd.—Present: 14 members and seven visitors.

TOP DRESSING PASTURES.—In the course of an address dealing with this subject, Mr. S. R. Cockburn said that constant grazing had considerably reduced the original carrying capacity of pastures. Every pound of wool, beef, or mutton and every gallon of milk sent away from the holdings had robbed the soil of plant food. It had been conclusively proved that top dressing with phosphatic manures at once put phosphates into the soil, and, by fostering the growth of clovers and trefoils, which were nitrogen gatherers, the soil was enriched with nitrogen. Superphosphates would give bigger results on grass land than on a wheat crop. If the soil required lime it should be supplied separately, but to apply lime alone on light lands was extremely undesirable, because it exploited the limited fertility they contained. Four or five weeks after applying the lime, the land should be top dressed with super. Phosphates would destroy onion weed, and eliminate bracken, because the clovers and trefoils came on so freely that these pernicious weeds were crowded out. Phosphates would not wash out of the soil, either in floods or seepage water. Except in localities where water was likely to remain stagnant in the winter, autumn applications of super usually paid best. The fertiliser thus applied brought on the pastures perhaps weeks earlier after the first rains, and the winter growth was not only more generous, but more nourishing. The spring growth was also earlier, and the growing period extended long into the summer. The method of application in general was by means of the ordinary seed drill. The tynes were left down where the soil was friable, and lifted where the surface was hard and rough. If no drill was available, or the land too rough for drilling, results equally as good could be obtained from broadcasting the super by hand. There were several machines on the market made specially for top dressing, the cost being about £30. Where cattle droppings liberally dotted the paddock, the land should always be harrowed before or immediately after top dressing, in order to break up and distribute the animal manure, and spread the grass seed incorporated in the droppings. In starting the system in a fresh paddock, it would be advisable to use 2cwt. per acre. After the first application the allowance might be reduced, and the frequency of the application would be determined by the revenue derived from the land. Stock might be safely left in the paddock whilst it was being dressed, but, if convenient, it was better to close the paddock to stock for a time, in order to allow the clover and grasses to become more firmly established. Mr. J. W. Williams said most farmers found weak patches in their crops, when the growth had turned to yellow. In such cases sulphate of ammonia was an effective remedy. He asked if the same results would be obtained by dressing the yellow patches with super. Mr. Cockburn said sulphate would restore the color, but it would not pay to use it on grass lands. It was phosphoric acid that the soils in South Australia lacked. Mr. H. F. L. Holzgrefe said he had been using super on grass land at Blue Gum Park for the past two years, and the results were undoubtedly encouraging. His paddocks, however, were thoroughly clean, and had been sown with grass seed. Regarding the results of super dressings on sandy land, excellent results were being obtained by an enterprising farmer on land at the foot of the Mount Muirhead Range. Mr. R. Varcoe said super had been used on land at Catalpa with no apparent result. The lecturer suggested that stock had eaten the increased growth as it came on, and advised Mr. Varcoe to watch his stock. He would find that they spent most of their time on the dressed portion of the paddock. Mr. J. W. Williams said he had seen at Mount Graham conclusive proof of the value of super on grazing land. It should be remembered, however, that in spending 5s. per acre on super each year, land purchased at £5 per acre would have cost the owner £7 10s. per acre at the end of 10 years. With wool, meat,

and dairy produce at present values he was satisfied that it would pay to use super, but on lower prices it would be a different proposition. Mr. Holzgrefe urged farmers to sow their land with grass seed before using a top dressing.

PENOLA (Average annual rainfall, 26.78in.).

December 1st.—Present: 11 members.

THE BLOWFLY PEST.—The following paper was contributed by Mr. G. Yeates:—"The losses to farmers and the pastoral industry throughout Australia as a result of the ravages of the blowfly are almost incalculable, not only by the loss of wool on the part affected, but to the whole fleece of each individual sheep that is atttacked by the pest. The flies also attack the lambing ewes, and the lambs of the ewes that are struck by the pest almost invariably die, if the ewe does not receive immediate attention. In dealing with the pest from a point of view of the introduction of an effective remedy, I consider that one of the best practices for the farmer to put into operation is the destruction of all dead animals and other carrion by burning after the flies have deposited their eggs in the carcasses. If each individual sheepowner systematically carried on the work of destroying all matter in which the blowflies could breed, the number of flies would be considerably reduced. To be successful, constant care and attention are necessary in the management of sheep. The owner must be watchful and attentive, and during the summer and winter the flock must be constantly watched to see if any of the sheep have been struck by the flies. Sheep that have been attacked should be yarded or caught in a corner of the paddock and the affected parts shorn very clean. To kill the maggots on the affected animal after it has been shorn, an application of a mixture of kerosine and oil will give good results. It is also advisable to smear Stockholm tar around the affected part. This will render the sheep immune from further attacks for a long period."

KONGORONG, August 27th.—Mr. P. E. Jenner read an informative paper, "The Cycle of Erosion," before a meeting of 19 members and 12 visitors.

KALANGADOO, November 10th.—The Hon. Secretary (Mr. W. J. Evans) read a paper from the *Journal of Agriculture*, "Tillage of the Soil," and a keen discussion followed.

NARACOORTE, October 13th.—Sixteen members and two visitors attended the October meeting, when an address, "Ploughs and Ploughing, Past and Present," was delivered by Mr. S. Shepherd, of the Kybybolite Branch, the speaker illustrating his remarks with the aid of the blackboard.

PENOLA, November 3rd.—Fifteen members and two visitors attended the monthly meeting of the Branch, which was held at Mr. D. Adamson's homestead, and an interesting afternoon was spent inspecting the experimental plots being carried out under Mr. Adamson's supervision.

RENDELSHAM, November 21st.—Mr. H. A. Stewart read a paper, "Drainage in the South-East," and an interesting discussion followed. Several other subjects of local interest were also brought before the meeting.

TATIARA, November 17th.—Mr. H. G. Fisher read a paper from the *Journal of Agriculture*, "Tillage of the Soil" which aroused a lengthy discussion.

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

No. 7 FEBRUARY 15, 1924. VOL. XXVII.

Published Monthly by the Department of Agriculture.

Edited by H. J. FINNIS.

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JOHN COWAN,
Minister of Agriculture.

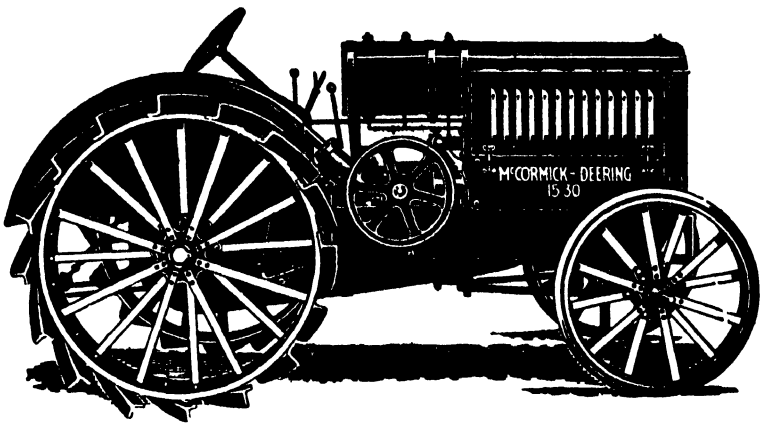
POINTS FOR PRODUCERS.

An American Visitor.

An officer of the Farm Bureau of the United States of America (Miss Marion Hardy) spent a few days in South Australia last month. During her stay in this State, Miss Hardy interested herself particularly in the work of the Agricultural Department, more especially the activities of the Agricultural Bureau. On Saturday, January 12th, she visited the Roseworthy Agricultural College, and on the following Monday visited Williamstown in company with the Secretary of the Advisory Board of Agriculture (Mr. Harold J. Finnis), with the idea of gaining first-hand knowledge of the working of country Branches of the Agricultural Bureau in this State. Under the presidency of Mr. E. Bain, a joint meeting of the Williamstown men's and women's Branches was held. The business was carried on in the usual way, the programme consisting of a paper by the Hon. Secretary (Mr. George Brown) on the "Export of Plums." This was discussed by the meeting, and then Miss Hardy addressed the gathering. After having dealt briefly with the organisation of the Farm Bureau movement of the United States of America, and the nature of the problems it was endeavoring to solve, she explained the scope of the work in which she was more particularly engaged, namely, the development of Farm Bureaux, or "organised communities," in the State of Vermont. "Family membership" was the rule in these communities. Amongst the women members, work consisted largely of the dissemination of information on domestic science problems, sanitation, and home dressmaking, a special feature being made of home to home visits by members for the purpose of gleaning information on labor-saving devices, kitchen arrangement, and, by no means least, the promotion of social intercourse. Amongst the children, which were organised into clubs, special "projects" were undertaken each year. Boys and girls, ranging in ages from 10 to 16 years, formed calf clubs, poultry clubs, pig clubs, or clubs designed especially to study and treat of other similar agricultural undertakings. Each club met just as did the older communities, a special feature being the annual achievement day, in which the work for the year was displayed and discussed. Miss Hardy's remarks were very well received by the audience, and on the motion of Mr. J. S. Hammat, seconded by Mr. H. J. Spencer, she was heartily thanked for her attendance. During her stay in Williamstown, Miss Hardy was the guest of Mrs. J. S. Hammat, Hon. Secretary of the Williamstown Women's Branch of the Agricultural Bureau.

Dairy Improvement Act.

Regulations under the Dairy Cattle Improvement Act of 1921 empower the Minister of Agriculture to grant, subject to certain conditions, subsidies of 60 per cent. of the purchase price of dairy bulls purchased at public auction sales arranged by the Government, or by private treaty. The first public auction arranged under the provisions of this legislation took place at the Royal Agricultural and Horticultural Society's Show in September last. Arrangements are now being made by the Department of Agriculture for a second sale, which it is proposed to hold at Murray Bridge, probably during March.



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Herd Testing in the Hills.

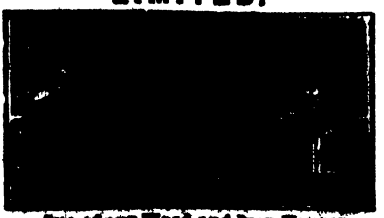
There is a prospect of a herd testing society being established in the Hills District. During February the Assistant Dairy Expert (Mr. H. J. Apps) visited Mount Barker and Tweedvale, and he found local dairymen keenly interested in herd testing. Two members of the Mount Barker Branch of the Agricultural Bureau have undertaken to make a canvass of the district with the object of securing sufficient members to establish the society forthwith. When in this district, Mr. Apps took an opportunity of addressing the local Branch of the Agricultural Bureau, and gave a demonstration of milk testing. Whilst at Tweedvale, Mr. Apps inspected the dairy herds of Messrs. Dearman Bros. and Sickerdick, and with the members of the local Branch of the Bureau, discussed the various points of judging cows and bulls. In the evening, Mr. Apps addressed a meeting of the Bureau.

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INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Replies furnished by Mr. A. H. ROBIN, B.V.Sc., Stock and Brands Department.]

Hon. Secretary, Mount Pleasant Agricultural Bureau, reports several ewes with breeding bag protruding; some of them about 6in. The ewes had not been in lamb.

Reply—Prolapse (or protrusion) of the uterus (or breeding bag) is nearly always incidental to lambing, occurring immediately (or at the most within two days) after the lambs are dropped. With respect to empty ewes, it is a rare accident, as it must be by virtue of the anatomical arrangement of the breeding organs. Two other conditions exist with which it could easily be confounded at first sight without a complete anatomical knowledge of the different organs, namely, prolapse of the vagina (or back passage) and prolapse of the bladder. Circumstances which would be apt to bring about any of these accidents (not following on lambing) would be fatness, depasturing over steep, hilly, or rough country, sudden violent exertion and straining hard (as might accompany constipation or diarrhœa). These circumstances suggest their own remedy as regards the removal of the cause operating to produce the accident. Treatment to be adopted to relieve the protrusion of the organs consists in first cleaning carefully, but thoroughly as possible, with warm water and very weak antiseptics, the protruding organs, and subsequent manipulation of them with clean oiled hands. Lay the animal on its back, and hold it up by the back legs, so that the hindquarters are raised well up above the level of the forequarters. By gentle manipulation attempts should be made to return the protruded organ to the inside through the lips of the vulva. In protrusion of the vagina this is all that is required. In dealing with the uterus or bladder, the finger should be introduced into the back passages, and the organ pressed through the neck of the uterus or bladder, as the case may be. To completely restore these organs to their proper position and avoid recurrence of the trouble, they can then be filled up with lukewarm boiled water in which a little boracic acid has been dissolved. Still holding the sheep up by the back legs, the weight of this introduced solution will complete the restoration of the organs perfectly into proper position. When the sheep is released and regains its feet, this solution will soon be passed out. Subsequently, to prevent recurrence of the trouble, as sometimes happens, the animal should be kept very quiet and, if possible, in such position that its hindquarters are somewhat raised. If the animal strains, she may be kept quiet by giving a small dose or two of laudanum. Prolapse, following on lambing, is treated in the same way.

"T. F.," New Hindmarsh, has cow with stiff hindquarters. On rising from the ground the animal drags her hind legs. After walking lamely for some little time a distinct click is heard, and the cow is able to walk properly.

Reply—The cow is suffering from a recurring luxation (or dislocation) of the patella, the small bone which lies at the front of the stifle joint (and which corresponds to the kneecap of man). This condition arises when the cow is lying down, or perhaps during her attempt to rise, and causes the stiffness of the whole limb. After a while it spontaneously becomes reduced (when the "click" you

mention takes place), and she is then able to move the limb freely again and walk normally. The best treatment you can adopt is to confine the cow for a few days in a stall, so that she is unable to lie down, and apply a good smart blister over the front and sides of the affected stifle joint.

Hon. Secretary, Agricultural Bureau, Shoal Bay, K.I., asks is a person liable for selling sheepskins carrying a registered brand, without the ears being left on the skin.

Reply—A person would not be liable for selling sheepskins bearing a registered brand if the ears have been cut off, unless it was done for some unlawful or improper purpose.

"G. P. S.," Pygery Siding, reports filly pastured in grass paddock. Turns the body to the off side, and walks in a circle, is "tucked up," and grinds her teeth. Inquirer also asks the correct dose of nux vomica to administer to horses.

Reply—If you can get hold of an equine mouth-gag, put it on the filly and make a thorough examination of her mouth. The continual grinding of teeth and loss of appetite may be due to some irregularity in connection with the teeth, &c. If you can find nothing in the mouth to account for her condition, give her a mild dose of physic (aloes 3drachms, calomel ½drachm, nux vomica ½drachm), and then give her one of the following powders night and morning for some days until she shows signs of returning appetite:—Pulv. nux vomica 1drachm, pulv. rad. gentian, 3drachms. Mix the powder with a spoonful of treacle to a sticky paste, and smear it over her back teeth and tongue with a smooth flat stick. Give the powder quarter of an hour before feeding. Tempt her appetite with good wholesome food. Of powdered nux vomica, horses can be given from one to two small teaspoonsful. Of tincture nux vomica, the dose is from two or three tablespoonsful.

"J. D.," Mount Bryan East, asks cure for blindness in sheep.

Reply—If possible, separate the affected sheep from the healthy, and keep them apart, because there is risk of the infection spreading by flies and other means. Keep the affected ones in a shady position. Bathe the eyes with a warm boracic acid solution, and put a few drops of the following lotion into the eyes so that it runs all over the eyeballs:—Zinc sulphate 2 drams, boracic acid 1 dram, distilled water 1 pint. Repeat this treatment, if possible, three or four times daily. The condition may, under this treatment, clear up fairly promptly, but it can also be fairly persistent in spite of the best of care and treatment.

"E. E. R.," Geranium, reports mare eight years old with large swelling on fetlocks. The mare is extremely lame.

Reply—Prepare the mare for a day with warm bran mashes, and then give a good dose of physic (aloes ball) on an empty stomach. Feed only on mashes until the physic has worked. Clip the hair over the fetlocks, and apply to each—all over the swelling—a good strong red blister, rubbing it well in for 15 to 20 minutes. (Take particular care to see that none of it gets down into the hollow of the heels.) The day after the blisters are applied, dress the fetlocks with warm water, soap, and antiseptic; rupture any water bags that have formed to let the fluid escape, and finally dress all over with vaseline or bland oil. Turn the mare out for a spell. If necessary, repeat the blistering in a month's time.

"F. J.," Port Pirie, has draught gelding, eight years old, with large swelling on inside of near hock.

Reply—The horse is suffering from a strained condition of the hock joint, and the swelling is due to an increased quantity of joint oil which has formed around the joint as a result. This condition usually exists without any accompanying lameness, but if aggravated by keeping the animal in work, lameness may be set up. In order to prevent this untoward happening, and to give the injured part every chance to recover and the swelling subside, you should turn him out for a good spell, first applying a blister all over the joint.

Hon. Secretary, Black Springs Agricultural Bureau, reports mare with foal two months old. The near front leg swelled and then burst; it decayed away, exposing the muscles. Eventually the mare had to be shot.

Reply—The condition probably arose as the result of some external injury of the affected limb—infection through a small punctured wound would be sufficient. It would appear that the condition should have been amenable to treatment if it had been attempted and pursued along right lines. The decay which took place

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would be caused by gangrene of the parts, due to the internal swelling interfering with the blood circulation. These decayed areas could have been excised with a knife or scissors, and if careful antiseptic treatment of the wounds had been carried out, supplemented by the internal administration of medicine to purify the blood of the animal, recovery should have been achieved. An early dose of physic, followed by repeated small doses of Epsom salts and salol, with green feed, would have probably been sufficient internal treatment.

Hon. Secretary, Agricultural Bureau, Wirrabara, asks for simple remedy for horses with itching heels.

Reply—If necessary, clip the hair covering the heels so as to expose them for treatment. Clean them out thoroughly with a good hoof brush to remove all scurf, scales, dirt, &c. Avoid the application of water to the heels; this will tend to aggravate. After thoroughly cleaning the heels in this way daub on frequently some of the following lotion:—Sugar of lead ½oz., cold water 1 quart, vinegar ½ pint. It may be necessary to supplement treatment by giving the animals a good dose of physic.

"W. N.," Coomandook, reports sheep with sore mouths after eating Scotch thistles.

Reply—It is not much good dressing the scabs without removing the cause operating to produce them; in other words, you should remove the sheep from grazing on the thistles. A suitable dressing would be an ointment composed as follows:—Acid boracic 1 dram, zinc oxide 2 drams, glycerine 2 drams, lard 3oz. Scotch thistles (*Onopordon acanthium*) have at the most only a slight fodder value, being best in the form of silage, which at the same time lessens the danger to stock fed on them, which exists on account of the spines.

Hon. Secretary, Agricultural Bureau, Marama, reports mare stiff and lame in the legs, "tucked up" appearance, hardly able to eat or drink. After drinking, water runs out through the nostrils. Also treatment for horse with splint.

Reply—The mare appears to have had an attack of influenza, which has implicated the pharynx and larynx, and it would be due to soreness in this part that would account for the return of water and food through the nostrils. I recommend you to feed her on sloppy bran and chaff, with an occasional warm bran mash, and for a week put a handful of Epsom salts in the feed night and morning to get the bowels working well. Water her from a bucket only, in which an ounce of soda hyposulphite is dissolved, daily. Give her also a dose of Fowler's solution, 1oz. twice daily for a period of 10 days, and then, after a rest for a week, repeat for a further 10 days. Rub the throat well with a good stimulating embrocation. (2) To treat the splint. Clip the hair closely over the part, and paint it daily with strong veterinary iodine (10 per cent.).

"H. J. K.," Rudall, reports cow, four years old on third calf, calved two weeks ago. Has now developed two lumps on the udder just above the hind teats.

Reply—Apply repeated hot fomentations, taking care to avoid chilling of the udder after the fomenting is discontinued. After the fomentations, carefully dry the udder, apply a little camphorated oil, and massage over the area of the lumps, gently but firmly.

GREEN SCUM ON STILL WATER.

Black Springs Branch of the Agricultural Bureau asks—"What is the cause of green scum on still water, especially well water in a trough?"

The Lecturer in Plant Pathology at the University of Adelaide (Mr. Geoffrey Samuel, B.Sc.) states that the green scum which frequently forms upon still water is due to the growth in enormous numbers of minute unicellular green algae (*Chlorophyceae*), a very simple form of plant life which always lives in water. It is found more frequently on stagnant well water, because well water often contains the mineral salts necessary for the growth of the alga in most suitable concentration. Occasionally the growth of such an alga has been a source of trouble in large reservoirs. In these cases it was found that the most minute trace of copper sulphate prevented the growth of the alga, while not being sufficient to render the water unfit for human consumption.

TURKEY.

"P. R.," Merildin, reports a turkey gobler with difficulty in breathing, which continually opens its mouth in a sort of gasp; on the roof of the mouth is a hard white swelling; bird is very mopey.

The Poultry Expert (Mr. D. F. Laurie) replies:—The disease is a form of roup. The cure is to cut open the swelling, press out any cheesy or other foreign matter, and flood the cavity with a few drops of ordinary tincture of iodine. Also give daily to each affected bird a teaspoonful of olive oil, adding three drops each kerosine and eucalyptus oil. This disease, in several forms, is common in the north. All you can do is to watch carefully for signs, such as swellings on face, especially under the eye. If you have no iodine, but have permanganate of potash (sometimes called Condy's crystals), make a strong solution, and after operating dip the bird's head in and out three times slowly, so as to medicate the mouth parts. The iodine is, however, preferable, and is cheap also.

CUTWORMS.

Shoal Bay Agricultural Bureau forwarded specimens of grubs that were destroying a member's potatoes. "They eat all the green leaves off, and then the potato seems to die right out. I have three kinds of potatoes growing in the same garden, but they only appear to eat the Carmens," the correspondent writes. "They are all in the same state of growth. These grubs just seem to live underneath the surface of the ground of a daytime, and come out of a night. I have repeatedly hoed the ground, but it does not seem to check them."

The Horticultural Instructor (Mr. Geo. Quinn) says:—"These are larvæ of a cutworm moth. If they are still existant use a bait made of paris green, say, 1oz. to 4lbs. bran, mixed into a paste with about a couple of pints of hot water in which a few ounces of treacle or sugar have been dissolved. Scatter it along near the potato stems, and the grubs soon find it. After eating they may burrow underground, but as a rule they do not emerge again.

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SUBTERRANEAN CLOVER.

(*Trifolium Subterraneum.*)

[By W. J. SPAFFORD, Superintendent of Experimental Work.]

Subterranean clover has been known for a very long time in Central and Southern Europe. In those countries it is looked upon as a roadside weed, but it has been proved in South Australia to be an extremely valuable fodder plant for certain districts possessed of special natural conditions. In some types of soil it will produce more high-class fodder than will any of the well-known fodder plants. The credit for discovering, proving, and giving publicity to this really important fodder is practically wholly due to Mr. A. W. Howard, of Mount Barker, South Australia, whose efforts for a period of more than 30 years in this direction are now being appreciated in all of the States of the Commonwealth and in many other countries in the world. Mr. Howard's endeavors to popularise this fodder plant have been unceasing, and throughout he has acted in a most public-spirited manner, writing articles on the clover, supplying seed gratis to many parts of the world, and giving full advice on methods of handling, &c., to all who desired his help, and fortunately he now has the gratification of seeing the fruits of his labors, for thousands of acres in this State alone are carrying subterranean clover, all the States of the Commonwealth grow some of it, and requests for seed and information are being received in increasing numbers from almost all countries in the world having a temperate climate.

Because of its special characteristics, this clover has revolutionised the farming practices of some districts in South Australia and has converted many farms, where difficulty has been experienced to make profits by other methods, into valuable sheep farms, with much increased land values, and now earning direct profits. However looked at, the discovery of subterranean clover as a fodder plant has been a most valuable one for Australia, and on present appearances will be recognised as such in many other countries in the near future, and the labors of Mr. A. W. Howard warrant the thanks of the country.

DESCRIPTION OF THE PLANT.

Subterranean clover is a prostrate, softly woolly annual, all parts of which are covered with fairly long, soft hairs. The three leaflets forming each leaf are carried on a long stalk, and each leaflet is heart-shaped and faintly toothed at the summit. The two small appendages growing at the base of the leaf stalks, although bluntly pointed, are almost oval in shape. Clusters of three or four small flowers of a creamy to pinkish color are produced on comparatively short stalks which spring from the axils of the leaf stalks, and immediately after flowering the stalk carrying the cluster of flowers turns downwards and grows until the seed head is pushed below the surface of the soil. On penetrating the soil the parts of the flower head surrounding the fertile flowers grow sufficiently to "anchor" the seed

head in the soil. Each fertile flower produces a one-seeded pod. Although an annual plant, the provision for burying most of its seed makes this clover equivalent to a perennial, and when once established it is practically permanent.

An individual plant in good conditions and given room for development will often completely cover the ground enclosed by a circle 6ft. in diameter, the central part of the circle, about 3ft. across, attaining up to 18in. or so in height, with the outer ring consisting of a mass of runners lying on the surface of the soil. Where a good stand of plants exists in fields which have been well supplied with phosphatic fertilisers, it is not unusual to have the whole land covered with a mass of luxuriant growth, 15in. to 20in. in height, the bottom 6in. or so consisting of a thick body of intermingled stalks, whilst above that is mainly leaf growth.



SUBTERRANEAN CLOVER—A Young Plant Before Runners have Formed.
Photo. by F. W. Pritchard.]

Climatic Requirements.

In South Australia subterranean clover seed germinates with the first autumn rains which are heavy enough for the purpose and which usually occur in April or early May. The young plants make some growth during the winter period, and by the end of August will have produced a thick mass about 4in. in height. When the warm weather of spring arrives they grow very rapidly, and remain green and continue growing until really hot weather is experienced, when they dry up. The possession of this characteristic of making slow growth in winter, rapid growth in spring, and maturing when the hot weather arrives, means that full returns from this clover can only be secured in those districts having a long spring period, and great success will not be obtained with the crop in those districts having a short growing period. In South Australia most of that part of the

country which receives more than 20in. of average annual rainfall has a sufficiently good climate to grow subterranean clover well. In a general way this plant requires a temperate climate with fairly heavy rainfall and long growing period to give full returns of fodder, and as it will withstand a fair amount of excessive wet and the ordinary cold of winter really well, maximum results are secured in those districts receiving from 30in. to 40in. of average annual rainfall, and a growing period of about nine months between the autumn rains and the really hot, dry weather of summer, providing always that the seed germinates before the cold weather of winter arrives.

Soil Requirements.

Subterranean clover appears to be able to accommodate itself to almost all types of soil, and given suitable climatic conditions and sufficient phosphoric acid will grow well in calcareous and in sour soils, in most clay soils, in all sands, and in peaty soils, but gives best returns in good, well-balanced loams possessed of good, natural drainage. In this State one of the few types of soil in which the clover does not thrive well, is the black, clayey soil forming part of some of the 'crab-hole" land of the South-East, but the extent of the country containing this soil type is so limited that it is not worth much consideration.

Much of the value of this clover depends on the fact that, provided phosphoric acid is supplied to the soils, it will grow extremely well on really "sour" soils, whether they be poor whitish sands, clayey soils containing much ironstone, or really fertile loams. The poorer types of "sour" lands are usually fairly plentiful where heavy annual rainfall and temperate climate are the rule, and it is not an easy matter to produce profits from the ordinary well-known crops on such soils, but subterranean clover flourishes in them to the exclusion of practically all other plants.

Time of Seeding.

Where this clover has become established the seed germinates with the autumn rains, makes good root growth during the cold winter period, but does not make strong stem and leaf growth unless the winter is very mild and warm, and on the approach of the warm weather of the spring season commences to make strong growth, and continues to make rapid growth until maturity is reached. If the young plants have not started before the cold weather arrives, the crop does not make the luxuriant stand which follows an early germination, except when an exceptionally long drawn-out growing season is experienced, and so for average seasons it is essential to seed subterranean clover in the autumn, and, if possible, to have the land prepared beforehand. The seed should be sown on the first autumn rain which is sufficiently heavy to lead to the germination of the seed

Method of Seeding.

If maximum returns from subterranean clover are being looked for, good soil preparation is necessary before the seed is sown. The land should be ploughed sometime between October and the following

March, and by the middle of April should be worked down to a really fine seed bed. The phosphatic fertiliser to be used with the crop should be now drilled into the land. As soon as the land is sufficiently moist to germinate the seed, the seed to be used should be mixed with some material such as bonedust or sieved earth (not sand) to act as a carrier, and the mixture can be distributed from the manure box of an ordinary seed drill, being careful not to allow the hoes to pene-



SUBTERRANEAN CLOVER—Portion of Young Plant Producing Runners, and Commencing to Flower. (*a*) Flowers.

Photo. by E. W. Pritchard.]

trate the soil to too great a depth. In this connection it would be much better for the seed to be allowed to fall from the drill tubes on to the surface of the land than for it to be sown too deeply. In "heavy" soils shallow seeding is absolutely essential, whilst in sandy soils less risk of a bad germination is taken, but even then ½in. should be taken as the maximum depth.

Superphosphate can be used as the "carrier" with which the seed is mixed, but it must be remembered that there is a danger of the germination of the seed being spoiled by contact with superphosphate. It is only safe to use superphosphate for this purpose (*a*) when the land is sufficiently moist to be in good germinating condition, or (*b*) when the land is quite dry, and on no account should the mixture be left for more than three hours before it is put into the land.

Broadcasting the seed after having drilled in the fertiliser generally ensures a good, regular germination, but much more seed is required, and the quantity of seed used per acre being so small makes the even distribution of it rather difficult. If broadcasted on the surface, either by hand, with a broadcasting machine, or from the tubes of a seed drill, it should be covered by pressing it into the soil with a land roller, or, failing this, by going over the land with "brush" harrows, because most of the other farm implements tend to bury this small seed too deeply.

Where full returns are not expected the first year it can be seeded with some other crop, and on low-priced land of light texture it is sometimes economical to treat the crop in this way. When an oat crop or a wheat crop is being seeded, a small quantity of seed can be mixed with the fertiliser being applied to the cereal. Many of these seeds will germinate and the plants will grow in the cereal crop, producing a lot of seed for the next year, and when a good germination has resulted and the stubble has not been too heavily grazed a very fair stand of clover is often the result.

In soils of light texture quite fair returns can be secured with this clover by seeding into the land without any preparatory cultivation, providing that the land is loose enough for the hoes of a seed drill to make shallow furrows when run over the ground. In this case, to give the clover plants a chance to compete with the other plants occupying the land, the seed should be put in before the first autumn rain while the soil is still dry, and plenty of phosphatic manure must be used. With this treatment a really good stand cannot be expected until the second or third year after seeding.

Rate of Seeding.

To establish this clover properly the year of seeding, on land that has been thoroughly prepared, at least 6lbs. of seed per acre are necessary, and best results are likely to be secured by increasing this amount nearer to 10lbs. per acre. On low-priced land, where the seeding is to be done in a cereal crop, about 2lbs. per acre will be sufficient. Where seeding without previous soil cultivation is to be practised, on light textured soils, 4lbs. to 6lbs. of seed per acre are necessary.

Manuring the Crop.

As with all plants which make rapid, luxuriant growth, subterranean clover gives best returns when liberally supplied with all the necessary plant foods, but perhaps better than most other cultivated plants it appears to have the power of extracting from almost any type of soil, its requirements of other plant foods when its needs as regards phosphoric acid are adequately met. In all soils found in those parts of South Australia which have suitable climatic conditions for the growth of this crop, with the exception of more or less white sands, the

equivalent of 2cwts. superphosphate (36 per cent.) per acre per year is sufficient fertiliser to apply to this clover to produce somewhere near to maximum returns. On poor, sandy land the addition of a potassic manure, say, 1cwt. kainit per acre per year, would be a marked advantage.



SUBTERRANEAN CLOVER—Portion of Young Plant Showing the Flowering and Formation of Seed Soon After the Runners Leave the Crown. This Production of Seed Continues for Months After the First Seeds are Formed. (*a*) Seed Burrs, Each Containing Three or Four Seeds; (*b*) Flowers.

Photo. by E. W. Pritchard.]

At present prices the cheapest way to supply the necessary phosphatic fertiliser would be to dress the land at the rate of 1cwt. superphosphate (45 per cent.) and 10cwts. finely ground raw rock phosphate

(82 per cent.) per acre once every 12 years; this would prove much more satisfactory than applying 2cwts. superphosphate (36 per cent.) or 180lbs. superphosphate (45 per cent.) per acre every year.

It must be remembered that it is almost impossible to grow subterranean clover successfully unless plenty of phosphatic fertiliser is applied to the crop, and even in the best of soils a very marked improvement to the clover crop follows every application of phosphate All fertilisers applied to this crop should be put into the land in the autumn before the first rains have fallen, say, in March or early April

Uses of the Crop.

Subterranean clover is mainly grown to be grazed in the green state, but it can be converted into a very attractive and palatable hay, and is a really good "dry" feed if left to mature in the field before being fed.

As green feed it tends to "blow" the ruminants (cattle and sheep) if they be turned on to it when wet, particularly if the animals have left a different type of fodder, but this is a recognised disadvantage of practically all leguminous fodders when green, and the danger is eliminated, or at all events lessened, by allowing the livestock to become accustomed to it gradually. In this stage it is a remarkably good milk producer with cows, a great fattener of cattle, sheep, and horses, and pigs do really well on it.

A good deal of care is necessary in converting the crop into hay, because it carries a very high proportion of leaf, and is at its maximum of growth before the hottest part of the summer has arrived, with the consequent danger of rain wetting the partly cured material, so sometimes necessitating much handling. When well cured, however, the hay is much relished by all farm livestock, and they will all fatten very readily when fed with it.

If allowed to stand in the field until dry it is still greedily eaten by livestock, and despite changes in the weather and much wetting and drying it remains a most useful and estimable feed, and in this respect is much more valuable than most other of our fodder plants if left to become dry. After livestock have eaten the leaves and dry stems, they continue to do well on this crop by searching for and devouring much of the rather enormous amount of seed left at and near the surface of the ground.

Besides producing much feed for the farm livestock, subterranean clover is a really good soil renovator, supplying much nitrogen collected by the bacteria living on its roots, and increasing the organic matter by leaves and stems dropped and trampled into the land whilst being grazed.

It is also a rather wonderful cleaner of the soil, for when growing well there are hardly any of the ordinary weeds found on our farmed lands which it will not choke right out. This is particularly noticeable in the case of the two almost useless weeds which occupy so much of the land where this clover will grow well, namely, sorrel and silver grass, both of which are choked out by the subterranean clover.



SUBTERRANEAN CLOVER—Pieces of Stalks Showing Development from Flowers to Seed. (*a*) Flowers Just Opening on Very Short Flower Stalk. (*b*) Petals of Flowers Just Drying—Note Increased Length of Flower Stalk. (*c*) Petals of Flowers Fallen—Flower Stalk Grown to Place Seed Burr in Soil. (*d*) Seed Burr Soon after Having Reached Soil Surface. (*e*) Seed Burr Enlarging, Showing Developed Seed Pods.

Photo. by E. W. Pritchard.]

Handling the Crop.

Being possessed of prostrate stems and the power of burying its seed, subterranean clover is enabled to withstand much heavier grazing than will almost any other annual fodder crop, and for that matter more than many of the perennial fodders. Nevertheless, the more care shown with the crop the greater will be the grazing results. During the winter period the crop should not be fed too close, because the more growth left on the plants at this time the greater will be the root development, and so the more rapid and more bulky the growth made when the warm weather arrives. Once the rapid growth has started livestock can be turned on to the crop, remembering that best returns can only be secured if the crop is fed off rapidly and not too close, then the livestock removed and kept off until there is sufficient growth to be a good "bite" for the animals. Rapid feeding off and resting the pasture will give the greatest success and can only be attained in practice by having small fields, and given this, good subterranean clover should be capable of carrying the equivalent of 10 sheep per acre per year. At the end of the season the crop should not be fed off too close, because livestock soon learn to stamp for the seed, and if the land is laid bare and is then scratched by livestock, much seed will be washed from the soil should the first autumn rain be a heavy one.

If the clover fields are to receive an annual application of phosphate, rather than a heavy dressing occasionally, this should be applied in the autumn before the rains have started, say, in March or early April, either by running the drill with the hoes in the ground, or by broadcasting it on the surface and then harrowing it in.

Clover fields should be cultivated or harrowed each year to distribute the droppings of animals and the residues of the plants, and should be done in the autumn before sufficient rain has fallen to germinate any of the seed.

Where a rather thin stand of the clover exists, it should be only lightly grazed, leaving at the end of the season noticeable clumps of clover, and during the autumn should be harrowed two or three times to make sure that seed is dragged on to the bare patches.

If another type of crop is required from land growing subterranean clover it can be grown without any danger of eradicating the clover, and after one such crop ample seed of the clover is left to give a full stand in the next season. Two successive crops grown on clover land will not destroy all of the seed, but when left out the clover stand is naturally rather thin, and if a full crop is required a little clover seed should be sown after the second crop has been removed.

Harvesting the Seed.

No difficulty is experienced in harvesting seed which is to be used on the farm where grown. This is not so, however, for the collection and preparation of seed for market. Crops to be kept for seed are not grazed, or, if so, only lightly in the early spring, but are allowed to grow until quite mature. When ripe the crop is raked—with a horse rake if only a limited amount of seed is required, but with hand rakes if large quantities are desired. A horse rake will collect about one-half of the seed that would be gathered by hand rakes from



SUBTERRANEAN CLOVER—Portions of Stalks Showing General Hairiness of Plant, and the Development of Flowering parts to "Anchor" Seed in the Soil. (*a*) Flower Head in Bloom. (*b*) Flower Stalk Extended in its Search for the Soil Surface Immediately after Completion of Flowering. (*c*) Flower Head which has Just Touched Soil Surface, Showing Commencement of Characteristic Development of Parts of Flower Head which "Anchor" the Seed Burr to the Soil. (*d*) Seed Head, Showing Further Growth of Flowering Parts. (*e*) Fully Developed Seed Burr as "Anchored" to Soil.

Photo. by E. W. Pritchard.]

a given area. If a power thresher is available, the raked up material is passed through it, which separates the seed burrs from the stems, but if no thresher is to be used the mass is passed through a chaff-cutter and the burrs winnowed from the stalks. Although some of the seeds are removed from their coverings by these methods they constitute only a comparatively small proportion of the burrs, and the mass would not be readily saleable. Still for one's own sowings these burrs, if well cleaned, are nearly as good as the hulled seed, and will be fairly evenly distributed from the manure box of the drill if mixed with bonedust, remembering that about three to four times as much unhulled seed is required as is needed if properly cleaned seed is used.

In preparing the seed for market the seed pods and burrs must be treated in a hulling machine, made specially for the treatment of this species of clover, in which all outer coverings of the seed are removed.

Pests of the Crop.

Although subterranean clover has been grown as a fodder crop in South Australia for over 30 years now, the only pest doing noticeable damage to it is the Lucerne Flea (*Smynthurus viridis*), and, although the hordes of this small insect which appear in the early spring play havoc with the crop, they are only present for a short while, disappearing as the weather warms up, and the crop very quickly recovers from their attack. A grazing crop of clover affected by this pest should be rapidly fed off by livestock, and if the insects were still present when sufficient growth had been made to enable livestock to graze it, the animals should again be put on the stand. It would pay to spray an affected crop, which was required for seed, using a weak solution of an arsenical spray, soap and tobacco spray, or an oil emulsion, being certain to apply the spray at night when the insects are active.

Subterranean Clover in Mixtures.

The prostrate habit of subterranean clover and its strong and rapid growth lead to the smothering out of most other plants growing on the same land; still it will grow well in conjunction with any of the true grasses which start to make their spring growth a little sooner than does the clover. The best of the grasses for this purpose are Perennial Rye Grass and Italian Rye Grass, the latter requiring reseeding every second year. Of necessity a mixture of one of these grasses and the clover would only be attempted on really fertile soils, but on the poorer types of soil clover alone would be grown. Drained peat land or rich valley bottoms could be seeded with 4lbs. subterranean clover and 20lbs. Perennial Rye Grass per acre if a good mixture was required, and would produce an enormous quantity of really good pasture.

Summary.

1. Subterranean clover, although known as a roadside weed in Europe for a long time, has been proved in South Australia to be a really high-class fodder plant, and this result is almost wholly due to the efforts of Mr. A. W. Howard, of Mount Barker, South Australia.

2. The power of burying its seed below the soil surface renders subterranean clover equivalent to a perennial.

3. Individual plants of subterranean clover will possibly cover the whole of a circle 6ft. in diameter, whilst a good stand of plants will cover the whole land with a dense mass of growth from 15in. to 20in. in height.

4. Subterranean clover requires a temperate climate with fairly heavy rainfall (25in. to 40in. average annual rainfall), and a long growing period (nine months between autumn rains and hot, dry weather), to produce maximum returns.

5. Almost all types of soil will produce subterranean clover well.

6. Much of the value of this clover depends on the fact that it will grow well on really "sour" soils, provided that plenty of phosphoric acid is supplied to the land.

7. The seed must be sown in time to germinate before the cold weather of winter sets in.

8. The seed can be drilled into the soil, or else be broadcasted on the surface and then worked into the land, but shallow seeding is essential. Good soil preparation is necessary if a proper stand is required in the first year, but the seed can under some circumstances be sown with another type of crop, or be drilled into "grass" land without previous cultivation.



SUBTERRANEAN CLOVER—Sod Cut from a Crop Showing Denseness of Growth Made by this Plant when Grown in Suitable Conditions.

Reproduced from "Fodder Crops for Australia," by Leslie H. Brunning.]

9. Six pounds to 10lbs. of seed should be used to give a full crop in the first year; about 2lbs. if sown with a cereal crop; and about 4lbs. to 6lbs. of seed if seeded into soil not previously prepared.

10. It is almost impossible to grow subterranean clover well in the soils of districts with temperate climates unless plenty of phosphatic fertiliser is used, and for high returns the equivalent of 2cwts. superphosphate (36 per cent.) per acre per year should be applied. At present the application of 1cwt. superphosphate (45 per cent.) and

10cwts. finely ground raw rock phosphate (82 per cent.) per acre once every 12 years is possibly the cheapest way to apply the phosphoric acid. All manuring should be done in the early autumn.

11. Subterranean clover can be used with advantage to livestock when green, as hay, or as "dry" feed.

12. This clover is a good soil renovator, collecting much nitrogen and increasing the organic matter content of the soil. It is also a good soil cleaner, choking out most of the ordinary farm weeds.

13. Subterranean clover should be grown in small fields so that it can be fed off rapidly, then rested until again ready for livestock. Clover fields should be cultivated or harrowed each year in the early autumn. Thin stands should be harrowed two or three times in the early autumn to ensure that seed is spread on to the bare patches. Clover fields will allow of a crop of another kind being grown for one year without affecting the clover stand.

14. In collecting seed the crop is raked up, threshed, and then hulled in a machine made specially for the purpose.

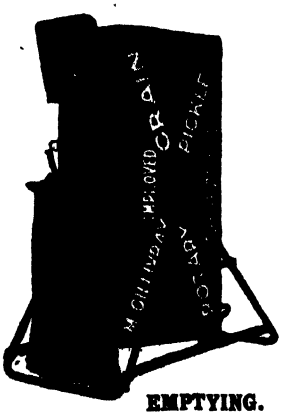
15. Lucerne Flea is the only pest doing much damage to the subterranean clover crops, but then only to "seed" crops, because the pastures are fed down heavily each time that they are attacked.

16. Subterranean clover will grow well in admixture with the rye grasses on those soils suitable to these grasses.

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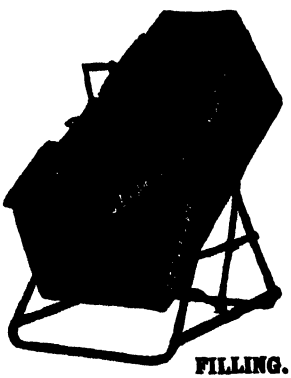


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THE STATE EXPERIMENT ORCHARD, BERRI.

Comprising an area of 79½ acres of irrigable land, together with 157½ acres of "dry" land situated above the channels, the State Experiment Orchard, Berri, is well known as the principal activity of the Department of Agriculture on the River Murray Irrigation Settlement in South Australia. The site of the orchard was reserved from the original Berri Irrigation Area in 1911. Experiments were formulated and planned by Mr. Geo. Quinn, Horticultural Instructor of the Department of Agriculture, but the orchard did not come under the direct control of that Department until 1917.

The irrigable portion of the area is watered from the main channels, representing lifts of 120ft., 70ft., and 40ft., respectively. The soil watered from the two channels first named is the typical sandy loam of the Murray Valley, varying from a depth of less than 12in., on some of the upper slopes to many feet in the slight valleys before the usual marly clay or limestone rubble is touched. The land irrigated from the 40ft. channel is mostly of a very different character. Beneath a thin stratum of drifted sand an extremely tenacious clay subsoil is encountered, which in its processes of cementation has become so compacted that it was almost impossible to induce reasonable percolation of water under ordinary irrigation methods, and one of the tasks undertaken has been to render these sublayers more pervious. Thus within the area comprising this station are to be found nearly all of the soil problems which confront the irrigator along the Murray Valley; shallow, drifty, and calcareous on the upland, deep sandy in the valleys or along the lower slopes, spreading out thinly on to stiff clay soils on the flats, bringing in their train and incidence the problem of superfluous water and concentrations of soluble salts under ordinary methods of tillage and irrigation.

Inspection by Advisory Board.

This orchard was inspected by the members of the Board of Agriculture on Wednesday, January 23rd. The Minister of Agriculture (Hon. J. Cowan, M.L.C.) was present and officially welcomed to the orchard the party, which consisted of the Vice-Chairman (Capt. S. A. White, C.M.B.O.U.), Col. J. Rowell, C.B., Professor Arthur J. Perkins, Messrs. F. Coleman, H. Wicks, C. J. Tuckwell, A. M. Dawkins, H. J. Finnis (Secretary), and the Horticultural Instructor (Mr. Geo. Quinn). In his address of welcome, the Minister expressed his appreciation of the services gratuitously rendered the producing interests of the State by members of the Advisory Board, and intimated that he proposed strengthening the Board by the addition of new members. He had extended invitations to Mr. H. S. Taylor, of Renmark, to represent the Irrigation Settlements on the Board, to Mr. A. B. Feuerheerdt, of Naracoorte, to represent the South-East, to Mr. P. H. Jones, of Pinnaroo, to represent the mallee farming areas, and to Mr. J. Wallace Sandford, who had previously occupied a seat on

the Board as President of the Royal Agricultural and Horticultural Society, to continue as a representative of the dairying interests. He had also appointed Mr. C. A. Loxton, B.V.Sc., Chief Inspector of Stock, to the Board.

The Work in Hand.

Under the guidance of the Manager of the orchard (Mr. C. G. Savage) the party then set out on a tour of inspection, first visiting Block A., consisting of 10 acres of trees planted in 1911. Amongst the tests being conducted on this block were pruning trials with different varieties of peaches, cincturing and root pruning tests with orange trees, and manurial tests with varieties of fertilisers applied to orange, peach, and apricot trees. In Block B, comprising 11½ acres, there were variety tests of nectarines, and 5 acres devoted to Smyrna figs planted in 1923, 3 acres under preparation for almonds oranges, and variety tests with almonds. Block C carried 2½ acres of Smyrna figs planted in 1923, 3 acres under preparation for almonds with the object of testing the value of this tree as a commercial proposition when planted in solid blocks, and a collection of home garden fruits. Block D was occupied principally by vines of the Muscat Gordo Blanco, Zante currant, and sultana types pruned and trained to a number of different systems for comparative purposes. Block E was occupied by Washington navel oranges undergoing fertiliser trials, and Smyrna and white Adriatic figs being tested commercially. An area of 2½ acres was under test to various citrus stocks. Block F contained date palms, fertiliser trials with Muscat Gordo Blanco vines, and pears for drying purposes. Block G was planted to sultana and currant vines which are being dressed with different fertilisers for comparative purposes, and prune and apple varieties. Block H is under lucerne to provide feed for the orchard horses. The 14 acres comprising Block I have been planted to walnuts, heavy bearing vines one-quarter acre devoted to a variety vineyard, and one-third acre to sultana vines planted for the purpose of providing vines on which to initiate tests to try out problems in pruning and training which might crop up from time to time. Ohanez export grape, trained on 7ft. trellises, occupies five-eights acre, and cincturing tests with currant and sultana vines one-quarter acre. Prune stock tests, and Gordo, sultana, Doradillo, and currant vines being treated with varying quantities of fertilisers, occupied the balance of this block, the boundary of which has been planted with a windbreak of olives. The spread of a salt patch which appeared early in the history of the orchard has been effectively controlled by the installation of a system of underground drainage. At the time of the visit one series of drains was in operation, and another was being laid down.

SECOND REPORT OF THE DAIRY HERD OF AYRSHIRE COWS AT THE KYBYBOLITE EXPERIMENTAL FARM.

October 1st, 1922, to September 30th, 1923.

[By L. J. Cook, Manager].

A few years ago some good types of pedigree Ayrshire and grade Ayrshire cattle were purchased from various noted herds in Victoria for the Kybybolite Farm as the nucleus of a herd to test the possibilities of the district for dairying. The natural climatic conditions led to the choice of this hardy Scotch breed of milking cows, and they have so far undoubtedly proved that they can withstand the comparatively cold and wet winter conditions very well, and their natural habit as good foragers enables them to secure the most from the gradually improving pastures of Kybybolite.

It is proposed in this report to deal solely with results obtained from young cows, bred and reared on the farm, and which therefore have known no other conditions than those existant at Kybybolite. We now have a fairly complete dairy plant equipment, including milking machines, feeding and housing shed, one 90-ton silo, and a dairy for handling milk, cream, &c., sufficient for us to give the herd reasonable treatment, and careful records of milk supply, tests, and feeding have been kept continuously for the past two years.

Table I. shows the monthly production for all cows during the last 12 months in the herd that were bred and reared at the farm.

TABLE I.—*Statement showing Total Production by Ayrshire Cows (bred and reared at Kybybolite Experimental Farm) for* 12 *Months ending September* 30*th*, 1923.

Month.	Average Cows under Test.	Average Cows in Milk.	Average Butter-fat Test.	Milk.		Butterfat.	
				Produced by Herd.	Per Cow.	Produced by Herd.	Per Cow.
1922-23.	Cows.	Cows.	%	Lbs.	Lbs.	Lbs.	Lbs.
October	14·00	10·50	4·62	7,070	505	326·45	23·32
November	14·36	10·36	3·96	7,969	554·98	315·35	21·96
December	15·00	12·00	3·87	9,315	621	360·66	24·04
January	16·10	14·00	4·10	10,526	653·79	431·63	26·81
February	18·00	16·70	3·90	9,912	550·66	386·88	21·49
March.....	18·00	16·00	3·93	8,709	483·83	342·39	19·02
April.....	18·73	14·63	4·14	6,023	321·57	249·58	13·33
May	19·52	13·23	3·97	6,120	313·52	242·92	12·44
June	20·00	15·40	3·96	8,218	410·90	325·33	16·27
July	21·00	16·80	4·05	9,946	473·62	402·93	19·19
August	22·84	19·39	3·92	11,105	486·21	435·14	19·05
September	24·47	19·67	3·71	13,671	558·68	506·53	20·70
Means.....	18·50	14·89	3·98	—	5,933·76	—	237·62
Total production for year				108,584	—	4,325·79	—
Average daily production				297·5	16·26	11·85	0·65

It must be noted that this result has been practically obtained from cows on their first and second lactation periods. During the 12 months five cows completed their first lactation period, eight cows completed their second, one cow completed her third, whilst 11 other heifers have started their first period. The very low average returns for April and May were undoubtedly due to the unusually dry autumn, and as several cows were nearing the close of their lactation periods it was impossible to keep them up to their milk. The continued wet following throughout the winter months and the consequent poor growth of feed and crops, deprived the herd of early green feed, and caused the average returns for June, July, August, and September to be lower than they should be in ordinary seasons. It is to be noted that the poor weather conditions have reduced the percentage of butterfat, more so than the supply of milk. Judging on the season and the age of the cows the general average return for the year of 593galls. of milk and 238lbs. butterfat per cow can be looked upon as satisfactory.

The disposal of our dairy products at present is perforce confined to the sale of cream for butter making and the utilising of skim milk in pig raising. For the 12 months under review the prices received for butter have been good, and the actual average price received at the farm for each month is as follows:—

1922—		
October	1s. 1.42d.	per lb.
November	1s. 0.58d.	"
December	1s. 0.77d.	"
1923—		
January	1s. 3.43d.	"
February	1s. 4.98d.	"
March	1s. 7.69d.	"
April	1s. 10.08d.	"
May	1s. 10.14d.	"
June	1s. 6.85d.	"
July	1s. 5.25d.	"
August	1s. 1.25d.	"
September	1s. 2.56d.	"
Mean	1s. 4.58d.	per lb.

Allowing for 15 per cent. overrun we find that we received 4,974lbs. commercial butter from the cows in the herd. This at 1s. 4.58d. per lb equals £343 12s. 5d. Add the value of skim milk, 10,425galls., which at 2d. equals £86 17s. 6d, makes a total value of £430 9s. 11d. received from the 18.5 cows (average number in herd for the 12 months), or a return in cash of £23 5s. 5d. per cow.

Feed.

A careful record of feed given to cattle on the farm has been kept, and the average quantities fed to each milch cow, together with fair estimated market values are shown in the next table.

TABLE II.—*Average Feed Consumed per Milk Cow at Kybybolite Experimental Farm for 12 Months ending September 30th, 1923.*

Quantity.	Variety.		Price.	Value. £	s.	d.
14cwts. 3½qrs.	Hay chaff	@	£4 per ton. ...	2	19	6
1 ton 16cwts.	Ensilage	@	£1 per ton.....	1	16	0
11bush.	Bran	@	2s. 2d. per bushel ...	1	3	10
33½bush.	Oats (crushed) .	@	3s. per bushel.....	5	0	6
4 4cwts.	Greenfeed	@	10s. per ton	0	2	2
4 acres	Pasture	@	4s per acre rent ...	0	16	0
	Total value of feed per cow			£11	18	0

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During the year the herd was necessarily a good deal hand fed to supply concentrates and make good the shortage on the pastures, and the foods used were almost wholly produced on the farm. The little bran was the only purchased feed, and this was given during the latter months of 1922 when our supply of oats was running short. Crushed oats were fed as concentrates to all milkers during the rest of the period, the quantity fed varying with the quantities of milk produced by the cows individually.

With reference to bulk feed, our supply of ensilage was short; hay chaff was mixed with the ensilage throughout the autumn and winter months. Very fair grazing was available for the cows during the spring and summer months, but through the lack of early rains and the extremely wet winter no bulk of green feed has been available this year until September.

Approximately the milking herd obtained half its bulk feed from growing pastures during the year. Calculating that ordinary pasture of the district carries at the rate of three-quarters of a sheep, or 75lbs. live weight of stock per acre, and allowing 600lbs. as the average live weight of young cows, I have therefore allowed an estimated acreage of four per cow for pasture, and hence have charged the nominal rate of 4s. per acre as rent against each cow.

During the winter, from May 1st to September 30th, all milk cows were housed over night.

It is not proposed in this report to go into the full details of balancing accounts for this herd, but the balance left, £11 7s. 5d., after subtracting cost of feed from value of produce received, should be made to cover the cost of labor and upkeep with the aid of up-to-date machinery, and return a fair percentage of interest on capital outlay.

The following table shows the average returns from the dairy herd for the past two seasons:—

TABLE III.—*Average Returns from Ayrshire Dairy Herd, Kybybolite, 1921-23.*

Year.	No. of Cows.	Milk Yield per Cow.	Average Test.	Butter fat Yield per Cow.	Price per Lb.	Gross Return per Cow.	Value of Feed per Cow.	Net Return per Cow.
		lbs.	%	lbs.	s. d.	£ s. d.	£ s. d.	£ s. d.
1921-22	10·15	5,715	4·36	245	1 1·3	19 13 7	9 11 0	10 2 7
1922-23	18·50	5,934	3·98	238	1 4·58	23 5 5	11 18 0	11 7 5
Means.	14·32	5,824	4·17	241	1 2·94	21 9 6	10 14 6	10 15 0

Following is a list of individual records of the cows, in order of merit, that have completed lactation periods during the past two years.

TABLE IV.—*Showing Returns from Individual Cows that Completed Lactation Periods of 273 days between October 1st, 1921, and September 30th, 1923.*

Date of Completion of Test.	Name.	Age at Start of Period.		Last Day of Test.	Milk. Means per Day.	Milk. Total.	Butter Fat. Mean per cent.	Butter Fat. Total.
		Y.	M.	Lbs.	Lbs.	Lbs.		Lbs.
	Cows on First Lactation Period.							
Feb. 28, 1923	Rose of Kybybolite	2	6	19	24·92	6,804	4·07	277·19
July 13, 1922	Countess of Kybybolite	2	4	13	22·20	6,060	4·59	278·23
Mar. 7, 1923	Joan	3	1	10	20·80	5,678	4·52	256·61
Mar. 30, 1923	Betty of Kybybolite	2	8	5	20 94	5,717	4·21	240·59
Mar. 14, 1922	Pansy	2	2	6¼	19·94	5,444	4·24	230·76
Mar. 11, 1922	Ruby of Kybybolite	1	11	6½	19·05	5,201	4·33	225·42
Aug. 19, 1923	Laurel	2	8	12	21·03	5,741	3·63	208·33
Mar. 30, 1922	Blanche of Kybybolite	2	6	8	18·04	4,925	4·28	210·89
Aug. 27, 1922	Lola	2	2	12	16·88	4,607	4·29	197·78
Mar. 30, 1922	Maggie of Kybybolite.....	1	8	11	17·95	4,900	3·99	195·63
May 27, 1922	Lily	2	6	2¼	14·73	4,022	4·34	174·56
April 15, 1923	Lilac of Kybybolite (256 days)	2	2	—	12·17	3,322	4·61	153·25
Oct. 1, 1922	Lady of Kybybolite	3	3	2	14·73	4,020	3·81	153·21
	Means				18·72	5,111	4·22	215·57
	Cows on Second Lactation Period.							
June 30, 1923	Countess of Kybybolite (259 days)	3	4	-	25·55	6,975	4·49	313·29
April 12, 1923	Blanche of Kybybolite	3	7	11	26·07	7,116	4·26	302·95
Mar. 7, 1923	Ruby of Kybybolite	2	11	6	22·44	6,126	4·20	257·12
Aug. 16, 1923	Lola	3	2	2	22·13	6,041	3·97	239·81
Feb. 22, 1923	Pansy	3	2	1	19·82	5,410	3·86	208·95
April 21, 1923	Lily (242 days)	3	6	–	19·01	5,190	3·81	197·80
July 31, 1923	Maggie of Kybybolite (252 days)	3	0	–	18·70	5,106	3·77	192·27
Dec. 31, 1921	Duchess of Kybybolite.....	3	3	—	15·29	4,175	4·88	203·68
June 10, 1923	Lady of Kybybolite (158 days)	4	3	-	11·90	3,249	3·80	123·55
	Means				20·1	5,487	4·12	226·6

From the above tables it is noticeable that the returns of Countess, Rose, and Blanche are highly satisfactory. Lady has failed in two periods and consequently she has been fattened. It is of interest to note that all the cows in the above list, with the exception of Laurel, have been sired by the one bull, "Anthony of Gleneira," the foundation sire of our herd, who came from the Gleneira Stud, of Flinders, Victoria.

By referring to the "Standard Herd Test," part 9, volume XIX., of the *Victorian Journal of Agriculture* evidence will be seen that some of Anthony's heifers, sired before he came to us, are holding their own amongst the Ayrshires of Victoria.

We have been fortunate in being able to purchase a bull calf from one of the best cows of the Gowrie Park Stud, Victoria, and hope with the aid of this one, and "Loyalty of Bridge View" (son of the champion cow of Mr. R. J. Clements) to improve materially our herd in the future.

I wish to again congratulate the farm stockman, Mr. A. R. Rowe, who continues to handle the herd carefully and well.

WHEAT CROP COMPETITION AT PETINA

A Wheat Crop Competition was arranged by the Petina Branch of the Agricultural Bureau during the season just closed. Mr. R. Hill (Manager of the Government Experimental Farm, Minnipa) acted as judge. The crops exhibited were placed by Mr. Hill in the following order:—

Table Detailing Competing Crops in Order of Merit, and Points Awarded.

Competitor's Name Order of Merit	Position.	Present Crop Sown	Date of Seeding.	Amount of Manure (under)	Amount of Seed	Variety	Apparent Yield.	Trueness to Type	Freedom from Disease	Freedom from Weeds	Evenness of Crop.	Totals.
					lbs.		60 %	10 %	10 %	15 %	5 %	100 %
A. Johnson .	1	Fallow ...	Late in April	45lbs. 45 %	45	Late Gluyas	50	7	9	12	4	82
C. Campbell ..	2	September Fallow ..	19/5/23	56lbs. 45 %	50	Federation	45	8	9	13	4	79
G. P. Roberts	3	Ploughed in March	31/5/23 .. .	50lbs. 36 %	60	Late Gluyas	40	10	10	14	4	78
G. Campbell .	4	October . Fallow ...	1/6/23 ..	45lbs. 45 %	60	Late Gluyas	40	9	9	14	4	76
H. H. Howard	5	September Fallow ...	3/6/23	70lbs. 45 %	60	Late Gluyas	40	9	6	10	4	69
J. Bascombe .	6	Fallow .	Late in April	50lbs. 36 %	50	Late Gluyas	30	10	9	13	2	64

On the individual crops, Mr. Hill made the following comments:—

THE COMPETING CROPS.

1. *Mr. A. Johnson.*—Portion of this crop was sown on plain land, and the remainder on scrub land. A very fine crop with splendid head development; very strong culm for this variety, and good stooling, especially on the scrub land portion. Germination generally good, but better on the scrub land than on the plain. This crop was awarded highest points for apparent yield, but had heads of other varieties through it for which it lost points. There was a trace of smut in it; also a few weeds. Points were also lost on account of the unevenness of crop, some being on scrub, and some on plain land. The success of this crop was attributed to the fact that it was sown early more than anything else.

2. *Mr. C. Campbell.*—Grown on plain land. Exceptionally fine growth for Federation, with a fine head development. Germination was rather irregular, and stooling patchy but generally good. Fairly free from weeds, and there was a trace of smut through it.

3. *Mr. G. P. Roberts.*—This crop was sown on land ploughed up in March, and was a fine, even crop, gaining full points for trueness to type and freedom from disease. It was very free from weeds, but was rather late for this variety, and consequently lost points. Considering that it was seeded at the rate of 60lbs. of seed per acre, the germination was not what might have been expected. Stooling was fair, and it was an exceptionally good crop considering that it was on grass land. A heavier dressing of superphosphate would have probably made a remarkable difference to it.

4. *Mr. G. Campbell.*—Sown on plain land fallowed in October. This crop was exceptionally green for this variety at this time of the year, and with a dry spell would probably pinch, hence it lost points for apparent yield. It was very free from weeds, and also disease, but had a trace of smut in it. A very even crop, but rather poor stool ing. Considering that the seeding was at the rate of 60lbs. per acre. the germination was not good. The heads in this crop were short, showing a number of barren spikelets at the base.

5. *Mr. H. H. Howard.*—Sown on September fallow, and rather a disappointing crop considering that the super dressing was 70lbs. of 45 per cent., and the seeding was at the rate of 60lbs. per acre. Points lost on apparent yield on account of heads not being very well developed; only a fair germination. The stooling was fair, but smut was in evidence. This crop also had small patches of take all in it, and in one case a splendid illustration of how oats will resist this was seen. In a patch of take-all a very well stooled oat plant was thriving where the wheat had been wiped out. There were weeds in this crop, for which it also lost points.

6. *Mr. J. Bascombe.*—This crop certainly suffered from strong winds, and would no doubt have shown up much better had it had a more liberal dressing of superphosphate. It was uneven, the low-lying portions carrying a well stooled crop, but the remainder had poorly stooled, spindly growth. On one end of the field the crop had suffered badly from the winds and drift. Germination only fair: very free from disease, only an odd head of smut being noticed. Full points for trueness to type were awarded. This competitor has splendid evidence in the same field of what heavier dressings of superphosphate will do in a strip where he had been liberal with this fertilizer.

Comments and Suggestions.

Prior to presenting his report at a meeting of the Branch, Mr. Hill expressed his pleasure at the enthusiasm and general good spirit shown by all members of this Branch in connection with the competitions. He then proceeded to make suggestions which he thought might prove of interest.

Fallowing.

For the general improvement of crops, he said, more attention should be paid to early fallow. The land should be broken up as soon after seeding as possible. It should not be ploughed too deeply, and not over-worked. A loose surface worked to about the depth at which the seed was to be sown was all that was necessary once the land had been fallowed up. From then onward, the object should be to keep the soil below that loose surface well compacted. The land should be cultivated only when it was necessary to rid it of weeds or to break the surface after a rain. The practice sometimes followed of allowing the weeds to seed, and then attempting to destroy them by cultivation, was deprecated. He advised destroying weeds whilst they were still young, thus obviating the need of deep cultivation. Not only did that lessen the danger of the seed bed being broken up, but it also made it possible, very frequently, to effect the work with the harrows In such cases in which it seemed inevitable that the land would carry a crop of weeds he advised seeding an extra 10lbs. or 15lbs. of grain per acre, and thus endeavouring to crowd out the weeds.

Manurial Dressing.

Heavier dressings of superphosphate than were general in the district could certainly be applied with advantage. Especially was that so on those farms on which sheep were carried. The result would be a considerable increase in the stock-carrying capacity of the grass land. Dressings of 112lbs. of 36 per cent., or 90lbs. of 45 per cent. superphosphate were advised, especially where crops were being sown on "old" land.

Varieties.

He suggested that crops for competition should consist of as few varieties as possible. He advised the use of clean seed true to type.

Diseases.

The crops examined revealed the presence of Stinking Smut (*Tilletia tritici*) in the district, and recent tests showed that ½ per cent. solution of formalin proved the most effective treatment. Flag Smut (*Urocystis tritici*) was also noticed in some plots. Whilst none of the plots submitted for competition was more than lightly infected, he had noticed one crop in the district which was damaged to the extent of about 30 per cent. of the yield which might otherwise be expected. The treatment which he recommended where the disease was prevalent was to burn off the stubble, fallow the land, and keep it free of all rubbish. It should then be sown to oats or a variety of wheat different from that which had previously been grown on the land. Constant cropping with wheat tended to encourage the disease, and Gluyas was a variety that was more subject to it than some other wheats. It was inadvisable to sow until after the first autumn rains, in order to allow the spores to germinate before seeding was commenced.

"SUNTYNE" COMBINED DRILL AND CULTIVATOR CROP GROWING COMPETITION, 1923.

[By W. J. SPAFFORD, Superintendent of Experimental Work.]

Between November 20th to 23rd, 1923, Mr. F. Coleman, "Tuela," Saddleworth, and the writer judged the wheat crops entered in the competition for the best 100 acres of wheat sown by a "Suntyne" Combined Drill and Cultivator, such crops to be limited to those grown in the district of Yorke Peninsula, including Kadina, Wallaroo, and Port Wakefield.

This was the third year of the competition, which was for a trophy valued at £50, to be won twice before becoming the property of the competitor. One entry only was allowed to each farmer, and that was to consist of 100 acres of wheat, composed of not more than three varieties.

The crops were judged to the arranged scale of points of:—

	Per Cent.
Apparent yield	65
Trueness to type and purity	5
Freedom from disease	10
Evenness, condition, appearance, and freedom from defects	5
Freedom from weeds	15

This year the crops submitted to the judges were allotted the points set out in the following table:—

DETAILS OF CROPS.

Competitor's Name	Address	Position.	Total No. of Crops Grown on Field.	Present Crop Sown on—	Date of Seeding.	Amount of Seed.	Dressing of Super.
						Lbs.	Lbs.
Greenslade, S.	Urania	1	20	Fallow	15/6/23	85	90 (45%)
Heinrich, C. F. G.	Kilkerran	2	17	Fallow	27/6/23	75	80 (45%)
McCauley & Sons, A.	Maitland	3	17	Fallow (pt)	10/6/23	70	100 (36%)
				Grass land (pt.)	15/6/23	75	112 (45%)
Tippett, G. L.	Maitland	4	15	Fallow	18/6/23	75	120 (36%)
Linke, H. O.	Sth. Kilkerran.	5	15	Fallow	10/6/23	80	112 (36%)
Kelly & Son, Jos.	Urania.	6	20	Fallow	7/6/23	100	90 (45%)
Greenslade, G. L.	Maitland	7	30	Fallow	15/6/23	75	75 (36%)
Watters, S. J.	Curramulka	8	7	Fallow	16/6/23	60	112
Jericho, O. D.	Tiparra	9	20	Fallow	17/5/23	65	80 (45%)
Hasting, W. G.	Sth. Kilkerran.	Equal 10	15	Fallow	17/5/23	60	90 (36%)
Honner, E. & J.	Maitland	Equal 10	20	Fallow	1/6/23	70	80 (45%)
Goldsworthy, E. L.	Curramulka	Equal 10	16	Fallow	24/5/23	80	105 (45%)
Ormsby, C. W.	Price	13	15	Fallow	4/6/23	60	90 (45%)
Hart, G. H.	Edithburgh	14	17	Fallow	22/5/23	60	112 (45%
Gersch, A. R.	Urania	15	15	Fallow	4/5/23	70	100 (45%))

DETAILS OF JUDGING—POINTS AWARDED.

Competitors' Name.	Variety.	Apparent Yield.	Trueness to Type and Purity.	Freedom from Disease.	Evenness, Condition, Appearance, and Freedom from Defects.	Freedom from Weeds.	Total.
		65%	5%	10%	5%	15%	100%
Greenslade, S.	Major	55·5	4·5	8·5	4·5	14	87
	Field Marshal						
Heinrich, C. F. G.	Ford	53·5	3·5	9·5	4·5	14	85
McCauley & Sons, A.	Ford	48	4·5	9·5	4	13·5	79·5
	Late Gluyas						
Ippett, G. L.	Currawa	44·5	5	9·5	4·5	14·5	78
Inke, H. O.	Ford	46	4	9	4	13·5	76·5
	Queen Fan						
Kelly & Son, Jos.	Late Gluyas	43	4·5	8·5	4	12·5	72·5
	Ford						
	Nugget						
Greenslade, G. L.	Ford	42	4	8	4	13	71
	Federation						
Watters, S. J.	Ford	38·5	4·5	8	4·5	14	69·5
	Big 8						
	Late Gluyas						
Jericho, O. D.	Dart's Improved	41	4	8	3	12·5	68·5
	Currawa						
Hasting, W. G.	Ford	30·5	4	9	3·5	11·5	67·5
	German Wonder						
Honner, E. & J.	Ford	39	4	8·5	3·5	12·5	67·5
	Nugget						
Goldsworthy, E. L.	Federation	30	3·5	8	3·5	13·5	67·5
	Currawa						
Ormsby, C. W.	Currawa	36	3·5	8	4	13	64·5
	Late Gluyas						
Hart, G. H.	Ford	30	4	8	3·5	11	56·5
	Big 8						
	Nugget						
Gersch, A. R.	German Wonder	30	4	8	3	10·5	55·5

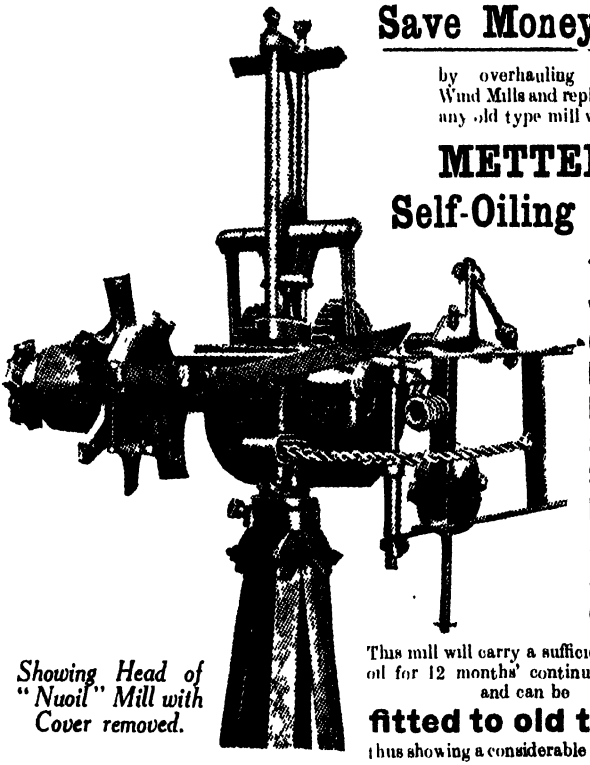
THE COMPETING CROPS.

1. *Mr. S. Greenslade, Urania* (Major and Field Marshal).—The crops submitted by Mr. S. Greenslade were again good, and at the time of inspection promised to give fairly high grain yields. Both varieties were fairly true to type, but the Major showed more admixture, by the presence of a few plants carrying bearded heads. The Major contained some "flag smut," and towards the east end of the block a number of very small patches of "take-all," whilst the Field Marshal showed just a little "bunt." Both crops were nice and even, except that the small late heads of Major were "white tipped," and the Field Marshal showed some wind damage. Hardly a weed was to be found in the Field Marshal, whereas, although the Major was not dirty, still it contained some barley, catchfly, charlock, drake, a sprinkling of wild oats, and a few turnip plants. A crop showing every evidence of good farming practices.

2. *Mr. C. F. G. Heinrich, Kilkerran* (Ford).—This crop of Ford contained a noticeable amount of club-headed and brown-chaffed wheats as admixture; was comparatively free from diseases, only showing "flag smut"; was nice and even; and was really clean, only showing a little charlock, poppy, and wild oats. On the whole, it was a beautiful crop and very regular, and a great credit to the grower.

3. *Messrs. A. McCauley & Sons, Maitland* (Ford and Late Gluyas).—The outstanding feature of this crop was the general excellence of the Late Gluyas grown on "grass" land, which was much above what would be expected. Both varieties were fairly true to type, but some

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bearded wheat was in evidence in the Ford. Not much disease was noticeable, except "take-all" and "flag smut" in the Late Gluyas. The evenness of both crops was affected by the presence of weak patches where an excess of water had obtained, and the Ford suffered a little from wind damage. Both crops showed burr clover, sheep weed, poppy, charlock, a little wild oats, and a little soapwort, but on the whole were fairly clean.

4. *Mr. G. L. Tippett, Maitland* (Currawa).—This was a nice, clean, and regular crop, true to type, showing just a little "loose smut," a little "take-all," and a little "flag smut," and a few of the following weeds:—Wild oats (in strips), charlock, sheep weed, soapwort, and barley.

5. *Mr. H. O. Linke, South Kilkerran* (Ford and Queen Fan).—The crop of Ford showed both bearded and brown-chaffed wheats as admixture, but the Queen Fan was fairly true to type. "Take-all" was in evidence in both crops, particularly the Queen Fan, and both varieties showed some "flag smut." The crop was slightly irregular, owing to "take-all" and the presence of comparatively extensive weak patches. Neither block was very dirty, but charlock, cockspur, wild oats, and soapwort were present, and a little barley was in the Queen Fan, and a few patches of the Ford were badly affected with wild oats.

6. *Messrs. Jos. Kelly & Son, Urania* (Late Gluyas, Ford. and Nugget).—In this crop all three kinds had made strong, rank growth, and were still fairly green at the time of judging. All varieties were fairly true to type, but the Ford showed more admixture than the others. Throughout the block "take-all" and "flag smut" were very noticeable, and both diseases had done most damage in the crop of Nugget. Ford showed some wind damage, and the Nugget was irregular, owing to the presence of so many "take-all" patches. The Nugget was cleaner than the others, yet contained more barley, and they all showed drake, cockspur, catchfly, melilot, wild oats, and canary grass.

7. *Mr. G. L. Greenslade, Maitland* (Ford and Federation).—The block of Ford contained, as admixtures, the bearded wheat and the brown-chaffed wheat so common in this crop in this district, and the Federation showed light-chaffed and tall wheats. "Take-all" and "flag smut" were in evidence, and to a greater extent in the Federation than the Ford. The Ford showed some wind damage, and the Federation, although good in places, was rather irregular. The crop was, on the whole, fairly clean, but contained soapwort, poppy, drake, wild oats, and barley.

8. *Mr. S. J. Watters, Curramulka* (Ford, Big 8, and Late Gluyas).—Of these varieties, the Big 8 and Ford were quite good, whereas the Late Gluyas was only fair. All were fairly true to type, and again the Late Gluyas was the worst of the three. Ford showed just a little "flag smut," otherwise was fairly disease-free; Big 8, besides "flag smut," contained "bunt"; Late Gluyas was affected by "take-all" and "flag smut." The Late Gluyas was rather patchy and uneven, but the other two varieties were nice and regular. This crop was fairly clean, yet showed patches containing barley, melilot, burr clover, barley grass, catchfly, and charlock.

9. *Mr. O. D. Jericho, Tiparra* (Dart's Improved and Currawa).—The Currawa was fairly true to type, but Dart's, which constituted the great bulk of the exhibit, showed quite a lot of "rogues." Both crops contained a fair number of small patches of "take-all," and a little "flag smut," but the reduced marks for "Freedom from disease" are due to the fact that the tracks and headlands, which were sown with an early variety, were only partly cut out, and what remained was very badly affected by "bunt." The Currawa was a nice, clean crop except for the barley, but wild oats were bad in parts of the Dart's, and it also contained cockspur and melilot.

=10. *Mr. W. G. Hastings, South Kilkerran* (Ford and German Wonder). The crop of Ford was really good, being fairly true to type, showing only a little "flag smut" and a little wind damage, but was rather dirty with wild oats, and contained some melilot, soapwort, poppy, canary grass, and charlock; whereas the German Wonder was only fair, containing some "take-all" patches and "flag smut," was really patchy, varying from good to poor, and showed wind damage, and, besides the weeds present in the Ford, contained barley and drake.

=10. *Messrs. E. & J. Honner, Maitland* (Ford and Nugget).—The crop of Ford was much better than the Nugget, only showing a little "take-all" and "flag smut"; was rather patchy, much of it being really good, whilst extremely poor patches were too prevalent, and showed some wind damage; and was a clean crop, showing a few patches of oats, a few poppies, and a little charlock. The Nugget was not a good crop, and showed "take-all," "flag smut," and "loose smut"; was patchy and irregular, and was rather dirty with barley, drake, soapwort, poppy, and charlock.

=10. *Mr. E. L. Goldsworthy, Curramulka* (Federation and Currawa).—Of the Federation and Currawa crops submitted, the former was less true to type than the latter, otherwise there was not a great deal of difference between them. They both showed "take-all" and "flag smut," and the Federation was also affected with "loose smut." The whole block was fairly irregular, and crops were very weak at the water runs, and although wild oats, poppy, charlock, and a little barley were present, on the whole they were fairly clean crops.

13. *Mr. C. W. Ormsby, Price* (Currawa and Late Gluyas).—The Late Gluyas, which only constituted a small part of the exhibit, was a very fair crop, being fairly true to type, only showing a little "take-all," fairly regular, but was light in centre of block, and so heavy in other places that it was lodging, and although showing drake, catchfly, and poppy, was fairly clean. The Currawa was a lighter crop, of which one part was badly mixed with other wheats, and it showed "bunt," "take-all," "flag smut," and "loose smut." It was fairly even, except for the "take-all" patches, and showed barley, drake, burr clover, a little charlock, and a lot of poppies.

14. *Mr. G. H. Hart, Edithburgh* (Ford, Big 8, and Nugget).—Of these varieties, the Ford was the most even crop, but it showed some "take-all" and wind damage, whilst both of the others showed "take-all," and "flag smut," and the Nugget was also affected with "loose smut." Barley, drake, barley grass, wild oats, and charlock were fairly thick, making the crop a rather dirty one.

15. *Mr. A. R. Gersch, Urania* (German Wonder).—This crop contained some brown-chaffed wheat, many patches of "take-all," and a fair amount of "flag smut." Because of "take-all," wind damage, and weak patches, it was rather irregular and uneven, and contained a lot of weeds, of which the following were prevalent:—Barley, charlock, drake, poppy, burr clover, wild oats, catchfly, cockspur, and a little soapwort.

GENERAL.

Most of the crops submitted to us were very creditable, and clearly showed that the farmers who left their crops in the competition understand the art of wheat production—this being particularly evident in the cases of Messrs. Greenslade, C. F. G. Heinrich, and A. McCauley & Son, where all crops seen on their respective farms displayed great care and correct crop-growing methods.

The outstanding weakness of the crops generally was the losses being produced by the ravages of "take-all," and that this can be avoided is evidenced by the fact that the crops of some farmers were practically free from the disease; and this was particularly noticeable on the farm of Mr. C. F. G. Heinrich, who has entered crops in this competition for three successive years, and although the soils of his farm are of a type more liable to this disease than are many others of the district, "take-all" was not doing damage to the wheat crops in any one of the three years.

NOTES FROM BLACKWOOD EXPERIMENT ORCHARD FOR JANUARY.

[By R. FOWLER, Manager.]

The weather during the month has been consistently cool, the temperature only registering over 100 in the shade on one occasion. The rainfall has been about equal to that of January, 1923; rain falling on eight days. The heaviest fall was 0.46 in. on January 8th. These conditions have favored the apple and pear crops, but have not tended to ripen properly the apricot, peach, and plum crops, most varieties of which are ripening from a week to 10 days later than usual, and do not seem to possess their usual characteristic flavours. Though the weather conditions during the month appeared to warrant a fear that the fungus diseases of trees might develop to a serious extent, such has not been the case, at least, so far as this orchard is concerned.

WOOLLY APHIS.

Woolly aphis is still very much on the increase. As mentioned in previous notes, a comprehensive test with crude salt was started in this experiment orchard this season—applications of salt up to 14lbs. in weight per tree being used, but up till the present with no beneficial results. Trees so treated are still badly infested with woolly

aphis. So far the salt does not appear to have had any detrimental effect of the tree itself, but it is questionable whether the practice of applying salt to a tree could be long continued without in the end seriously interfering with the life of the tree. This aspect of the test will be watched, and noted later on.

Russeting Apples.

Some fairly definite conclusions may now be drawn from the experiment set out to test whether Burgundy or Bordeaux mixtures cause excessive russeting of apples. It can now be said that under the climatic conditions prevailing in this locality it is not a safe practice to apply either of those sprays after the fruits have formed, though no russeting injury has resulted when applied at the pink stage. Trees sprayed with Burgundy 1-1-10 at this period are now carrying a heavy crop of perfectly clean fruit, but a portion of the same row sprayed again at the calyx stage with 3-4-50 Burgundy plus arsenate of lead for codlin, is carrying a heavy crop, of which almost every fruit is more or less covered with russet. The same results from this aspect are also shown in another test set out for a different purpose. In this instance 12 trees were sprayed with combined sprays, six with Burgundy 3-4-50 plus arsenate of lead, and six with lime-sulphur 1-40 plus arsenate of lead, with the object of testing whether any injury would result to trees or fruit or whether the selling would in any way be affected. Whilst not detrimental to the setting of the crop, it is now clearly shown that from the point of view of russeting the lime sulphur is the better spray to use, as the trees treated with this mixture are carrying a crop of clean fruit, while those treated with Burgundy are showing a lot of russet.

Spraying for Codlin.

We have just completed our fourth arsenate spraying for codlin moth. A portion of the trees—about three acres of the orchard—has had bandages applied, which are carefully looked over every seven days. So far the catch of grubs has not been very numerous, but is on the increase. The apple crop at present appears very clean, and varieties so far harvested show a very small percentage of grubby fruit. As the price for apples promises to be fair and the crop is good, it is to be hoped the season will not prove a bad one for this pest, but every care should be taken, and persistent efforts made, to keep it under control. Late varieties could still receive another spraying with advantage, as they are in danger of catching a brood hatched out from grubby apples left about under the trees, it being often almost impossible to clean this fruit up during the busy time of picking and packing.

The cherry slug—the larva of one of the saw flies—has been noted in this orchard in a previous season, but so far this season it has not put in an appearance. However, I understand it is doing some damage in other districts. It should be easy to control if prompt applications of arsenate of lead are made. It can do considerable damage in a short time if not attended to.



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SPECIAL LEAFLET ON APPLICATION.

BRUNNINGS

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Pruning the Young Tree.

An experiment of considerable interest started on the orchard this season is one having for its object the question of determining the best pruning practice when planting a young tree to produce a well-balanced head. Every aspect of the question is being considered, and a great number of data has been recorded, photographs taken, etc. The trees in this test—36 in number—are all growing well, and the various points being tested are now showing interesting developments.

Visitors.

This is the time of the year when visits to this orchard should prove of great interest to growers, and such visits either collectively as Branches of the Agricultural Bureau, Fruit Growers' Association, combinations of growers, or individually are welcomed by the Department. The apple and pear collections particularly are carrying good to heavy crops of fruit, and the numerous varieties that can be inspected and tested should have an attraction for the enterprising fruit grower. The numerous experimental tests, such as pruning, stock, tillage, manure, bitter pit, spraying, &c., should also interest growers, and need to be seen in the orchard to be properly understood and valued.

Handling Apples.

The principal work ahead will be the picking, and, with the commercial grower, the marketing and exporting of the apple crop. Every care must be taken in picking, grading, and packing if the best results are to be obtained. In spite of the constant repetition of this warning, one frequently sees fruit that has been handled as if it had been flints from the beach. Apples are dropped into cases, cases are dumped down by drivers when loading at stations after, perhaps, every care has been exercised up to that stage, and all these things, of course, have a bad effect on the market value of the fruit. It is impossible, of course, for the grower personally to handle all his fruit, but he should keep a watchful eye on everybody that has to handle it for him, and see that no carelessness is allowed anywhere.

Smyrna Figs.

During the month we have been busy with the caprification of the Smyrna crop of figs, but the Blastophaga wasps have been much later in putting in an appearance than usual, and the Smyrna figs were much later in developing. This is not a suitable district for growing these figs for drying purposes, for they mature too late in the season, but they make a most excellent preserve either bottled whole or as jam. Being very rich and sugary they are much superior to any other fig for this purpose.

We are having a very bad time with the birds—green parrots, starlings, and wattle birds being very numerous and voracious. Green pears are being attacked, and it would seem that unless supplies of their natural food are soon available that they are going to be the most destructive pest of the season, and serious steps will have to be taken to in some way overcome this.

MAITLAND BRANCH OF THE AGRICULTURAL BUREAU.

SECOND ANNUAL CROP COMPETITION, 1923.

[By W. J. SPAFFORD, Superintendent of Experimental Work.]

The Maitland Branch of the Agricultural Bureau continued the Crop Competitions inaugurated last year, and for 1923 offered prizes for the best 50 acres of wheat submitted by a farmer in the Maitland and surrounding districts. In this competition, the conditions laid down by the Advisory Board of Agriculture, which must be adhered to before the Government will give any monetary assistance, were accepted, and of these conditions the following have to do with the entries:—

Each crop entered must be of an area of not less than 50 acres. Entries need not necessarily be confined to one variety, but the maximum number of varieties permitted in one entry is three. Each entry should be in one block, or, at all events, in one field; but an exhibitor may submit the whole of a field less than 50 acres in extent, together with a sufficient area in another field to make up the required 50 acres.

Wheat crops entered for competition are to be judged on the following scale of points:—

Apparent yield	60
Trueness to type	10
Freedom from disease	10
Freedom from weeds	15
Evenness of crop	5
Total	100

The crops submitted this year were only eight in number, and have been allotted points as follows:—

Name.	Address.	Variety.	Apparent Yield. 60	Trueness to Type. 10	Freedom from Disease. 10	Freedom from Weeds. 15	Evenness of Crop. 5	To 100
S. Greenslade ..	Urania	Major	51	9	8.5	14	4.5	87
G. L. Tippett ..	Maitland ..	Currawa	45	9.5	9.5	14.5	5	83.5
E. F. Maloney .	Maitland ..	Ford	47	8	9	14	4.5	82.5
H. O. Linke	S. Kilkerran .	Ford	44	8	9	13.5	4	78.5
P. J. Bowey	Maitland ..	Crossbred 53	44	5	9	13.5	4	75.5
Ray Kelly	Urania	Ford	40	9	9	13	4	75
E. Arrowsmith .	Maitland ..	Onas Nugget Major	39	8.5	9	12.5	3.5	72.5
G. F. Pearce ..	Maitland ..	Major Federation	27	8.5	9	13	3	60.5

THE COMPETING CROPS.

1. *Mr. S. Greenslade* (Major).—This very good crop of Major wheat promised at the time of the inspection to produce a heavy-yielding grain crop, although it was then rather on the green side. Some plants with bearded heads were present as an admixture, and some "flag smut," as well as a number of very small patches of "take-all," were in evidence. Although the crop was fairly clean, it contained some plants of barley, catchfly, charlock, drake, turnip, and a sprinkling of wild oats. Other than the appearance of "white tip" on the small, late heads, this was a regular, even crop, and in every way was a great credit to Mr. Greenslade.

2. *Mr. G. L. Tippett* (Currawa).—This crop was true to type, with practically no admixture of other varieties, and showed just a little "flag smut," "loose smut," and "take-all." Very few weeds were present, but wild oats (in strips), charlock, sheep weed, soapwort, and barley were noticeable, and the crop was very regular and level. On the whole, an extremely good "competition" crop, but did not promise to yield as much grain as did Mr. Greenslade's crop of Major.

3. *Mr. E. F. Maloney* (Ford).—Although fairly true to type, some bearded wheat and some brown-chaffed wheat were scattered through the crop. A little "flag smut" and a little "take-all" were the only noticeable diseases affecting the crop, and although fairly clean, a little cockspur, wild oats, poppy, and burr clover were in evidence. Other than misses by the drill, this was a nice regular crop of wheat.

4. *Mr. H. O. Linke* (Ford).—Both bearded and brown-chaffed wheats were present as admixtures in this crop, and "flag smut" and "take-all" were taking their toll. On the whole, the crop was fairly clean, but patches were badly affected with wild oats, and charlock, cockspur, and soapwort were also present. The crop was a bit irregular, owing to "take-all," and comparatively extensive weak patches.

5. *Mr. P. J. Bowey* (Crossbred 53).—This crop was badly mixed with a smooth-chaffed wheat, but showed only a little "take-all" and a little "flag smut." Although it was fairly clean, wild oats, canary grass, poppy, and charlock were present. Both ends of the crop were really good, being tall, thick, and regular, but a strip across the centre was rather weak.

6. *Mr. Ray Kelly* (Ford).—This was a strong, heavy crop, still fairly green at the time of inspection. It showed some other varieties in admixture, and was affected by both "flag smut" and "take-all," and contained drake, cockspur, catchfly, melilot, wild oats, and canary grass. A fairly even crop, but showed some wind damage.

7. *Mr. E. Arrowsmith* (Onas, Nugget, and Major).—These varieties were very green and late, having little more than broken into head at the time of inspection. Although the Major was very nearly true to type, the Onas contained a taller variety, and the Nugget a noticeable amount of a stranger. All varieties were affected by "take-all" and "flag smut," and Major also showed some "loose smut." Quite an appreciable quantity of poppy, catchfly, sheep weed, wild oats, charlock, canary grass, and soapwort were present in all crops, barley in both Nugget and Major, and turnip in the Nugget. Water runs and wet patches made the crop rather irregular.

8. *Mr. G. F. Pearce* (Major and Federation).—Both varieties showed some admixture, and the Major showed "loose smut," as well as "flag smut," which was also present in the Federation. Charlock, poppy, burr clover, wild oats, sand rocket, hog weed, Cape weed, and barley (Federation) made the crops rather dirty. Parts of the crops were good, but others so thin and poor that on the whole it was rather patchy and irregular.

OBSERVATIONS AND RECOMMENDATIONS.

In discussing the crops seen in the Maitland district during the inspection of the Competition Crops in 1922, the opportunity was taken to deal in some detail with the following points:—

1. The presence of "bunt" or "stinking smut."
2. "Take-all" much in evidence.
3. The prevalence of "flag smut"
4. The introduction of bad weeds, such as barley and drake, with the seed.
5. Wheats grown which are badly "mixed" with other varieties.
6. The growing of obviously unsuitable varieties.
7. Too little seed used where the weeds are not killed when fallowing.
8. Insufficient fertiliser.
9. The presence of "eelworms" in the cereal crops.

After touring the district and inspecting many crops in 1923, it is certainly pleasing to note that some of the causes for complaint set out above hardly existed. "Bunt" or "stinking smut" was almost absent this season from all crops examined; practically every crop exhibited in the competition was seeded with sufficient seed and adequately fertilised; and a number of varieties likely to be more suitable than some which are fairly largely grown in the district were being tried.

"Take-all" in the wheat crops was fairly prevalent, but as many crops showed practically no signs of this bad disease, and some of these clean crops were on soils really liable to the trouble, it was quite evident that the disease can be controlled in this district if proper cultural methods are practised. (See *Journal of Agriculture* for January, 1923.)

"Flag-smut" was of common occurrence, but no crops were noticed which were as badly affected as some seen last year.

Some few of the crops seen contained barley and drake, two very bad weeds likely not only to reduce the yield of the wheat crops, but to reduce the price received, and if it is not convenient to purchase seed from crops which are free from seeds of these weeds, all seed used should be "graded" before sowing.

For the production of ordinary "market" wheat, the growing of mixtures of varieties does not matter much, providing that the kinds mixed have about the same maturing period; but better returns are likely to be secured from seed true to type. Crops of "mixed" varieties are usually a sure indication that the farmer does not show sufficient interest in the seed he uses, and if maximum returns are to be secured, only the very best seed available should be utilised.

MANAGEMENT OF DAIRY CATTLE.

[By R. Baker, Dairy Instructor, Roseworthy Agricultural College.]

The management of dairy cattle can very well be divided into three sections:—(1) The critical stages during the life of the animal; (2) feeding; (3) the question of disease.

It is necessary when dealing with the first section first to take into consideration the calf. The success of the dairying industry depends to no slight extent on the careful rearing of calves. From experience we are led to believe the dairy cow inherits her milk-producing qualities, and it is impossible by any kind of feeding to make an animal produce milk above her milk-making ability. Since this is true it is essential that a farmer should raise the heifer calves from cows possessed of high producing qualities. By care in the choice of a sire, and careful attention to feeding and developing of the heifer calves, he may even hope to increase the flow of milk from an individual.

In order to give a calf a proper start in life it is necessary that the cow should be given proper care before and at the time of parturition. It is a good practice to have a cow dry six to eight weeks before calving. This allows her time to prepare for the labor of partruition and her subsequent lactation period. It is only during the last few months that a growing foetus requires great quantities of nutrients for its development, and a cow should be in sufficient heart for the process of dropping the calf and production of milk Cows that calve without drying off, especially if they are heavy producers, generally drop weakly nourished offspring, showing the mother did not receive proper care. An excessively fat cow will also frequently drop a weak calf. The theory is that insufficient blood is used for the nourishment of the foetus.

It is necessary that during the last week the cow should be on a light laxative ration. This will not only result in her bowels being in good condition at calving, but will also act as a precautionary measure against milk fever. A pasture is a good place for a cow to calve in. If the climatic conditions are extremely cold she should be placed in some warm secluded spot or a well bedded roomy loose box.

Although it is not necessary for an attendant to be present while the cow is calving, one should be available if the cow needs assistance. If a cow calves normally the mother will immediately begin to lick the new-born calf, which is important as it starts respiration and improves the circulation. Sometimes the foetal membrane covers the

nostrils, and unless removed quickly it may cause suffocation. Occasionally for some reason or other the cow refuses to own her offspring. In such a case the calf should be washed down with warm water and thoroughly dried. The sprinkling of a small quantity of salt on the calf will sometimes induce the mother to lick it. A vigorous calf will attempt to rise about 15 minutes after birth.

The dairy heifer is almost always reared by hand, because of the value of milk for human consumption. There is some difference of opinion as to how long a calf should remain with the cow. Some believe in taking the calf away immediately after the cow has licked it over, not allowing it to suck; others allow it to have a couple of drinks; while again others allow the calf to remain with the mother until her udder becomes normal and the milk is fit for human consumption. There is very little difference as to the point, but it should be taken into consideration that the earlier a calf is taken from the cow the easier it will be to teach it to drink, also there is less trouble with the cow. If the cow's udder is in good condition when the calf is dropped it will be found more satisfactory to take the calf away early. On the other hand, if the udder is hard and caked, it is a good practice to leave the calf with the cow until the condition is removed.

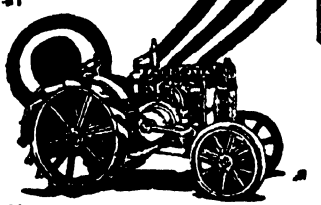
Care of New Born Calf.

The first milk a cow gives after calving is called colostrum, which is unfit for human consumption, but this abnormal milk possesses the property of acting both as a laxative and a stimulant to the digestive organs. It is necessary that the calf should receive this milk, not matter what system of feeding is carried out later on. This is the reason why a calf should receive its mother's milk for the first week. If for some reason other milk has to be given, it is advisable to administer small doses of castor oil every two or three hours until the bowels begin to move.

Amount of Milk to Feed.

It is necessary to have a calf growing well before any change takes place in its diet. The amount of milk to feed the first week will depend upon the size of the calf. Small calves, such as the Jersey, do not require more than 8lbs. to 10lbs., while larger calves do not require more than 10lbs. to 12lbs. The milk should be given at least three times a day at first, and at a temperature similar to that at which it left the cow's udder. Later on the calves need only be fed twice a day, and as they grow older, the milk may be increased, but should never be fed to a greater extent than 20lbs., even to the largest of calves. Under any system of feeding, it is essential that all utensils used for feeding of calves should be perfectly clean to insure best results.

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Skim Milk Feeding.

In localities where cream is sold there is usually a supply of skim milk on hand, and this can economically be fed in place of whole milk. Whole milk is usually fed for the first fortnight or three weeks, according to whether the calf is growing vigorously or not. The change to skim milk should be made gradually, taking about a week. When feeding skim milk, it is necessary to add something to take the place of the fat that has been removed by the separator. There are several substances that can be used to supplement the skim milk, among which are cornmeal, ground oats, and linseed. Cornmeal is an exceptionally good grain for calf feeding, being very rich in fat-forming material, but owing to the difficulty of obtaining it in sufficient quantities at an economical price, it is very seldom used in this State. Both linseed and ground oats are also very useful foods. Three parts of linseed and one of pollard, or three parts cornmeal, three of ground oats, one of linseed, and one of bran make good grain mixtures for feeding with skim milk to young calves. The grain may be either fed dry or in the form of a gruel by mixing with boiling water. The feeding of grain, like all changes in feeding calves, should be done gradually, or else digestive troubles may result. At first, about ¼lb. per calf per day should be given, the amount to be increased as the calf grows older, but it is never necessary to feed more than 2½lbs. to 3lbs. up to six months old.

Skim Milk Not Available.

In cases where no skim milk is available, and where whole milk has a great value for other purposes, calves can be raised by using a minimum amount of whole milk, gradually substituting a grain mixture. The following mixture may be used with good results:—Wheaten flour, 30lbs.; cocoanut meal, 35lbs.; skim milk powder, 20lbs.; linseed meal, 10lbs.; dried blood, 2lbs. 1lb. of the mixture added to 6lbs. of boiling water can be fed when cool in a bucket in the ordinary way. Calves are first given their mother's milk for about a week, then the milk substitute generally replaces the milk until at the end of ten days or two weeks no milk is given. For the first six weeks the young calves receive about 2lbs. of grain per day, and from then on about 2½lbs. till weaning, which takes place at the end of three months. The calves are then put on a hay and grain ration. Another method is using a minimum amount of milk and substituting rolled oats in the form of a gruel.

The calves should be taught to pick at grain and hay, which they will generally do when they are about three weeks old. Crushed oats

and bran can be kept before the calves in small quantities, and they will soon learn to eat it; also good oaten hay should be available. Lucerne hay is rather too laxative for a very young calf.

Feed and Care of Heifer after Weaning.

After weaning a dairy heifer, beyond the fact that she should be kept in good growing condition, the management does not present any particular difficulties. If the young animals are on good pasture, no further attention is necessary until ready to come into milk, since a pasture furnishes the best and usually the cheapest growth. If the pastures are deficient in nutriment, it will be advisable to give the heifer small quantities of crushed oats, bran, or linseed meal. When there is no pasture available, the heifer should be supplied with all the hay or good oaten straw she can consume, with a small amount of grain in addition. The object should be to keep the animal in a good, healthy condition, without becoming unnecessarily fat. The liberal use of bulky fodder is desirable, as it is the cheapest, and, further, it is believed by experienced breeders that the consumption of large amounts of bulky foods helps to develop the organs of digestion to the highest, which is necessary when a cow comes into milk. Ensilage, oaten and lucerne hay are well adapted to this purpose. The grain used in feeding the heifer should be such that the animal will put on flesh without becoming fat. Such grains as crushed oats, linseed meal, and bran are suitable.

Age at which to Breed.

The age at which the heifers should come into milk depends upon the maturity of the animal, which is governed to a great extent by the breed and feeding of the animal. Larger breeds such as the Friesians and Shorthorns as a rule should not calve before 30 months. The more rapidly developing Jersey is as a rule sufficiently matured at 24 months. The Ayrshire also takes longer to come to maturity. The heavy feeding of grain results in an animal large for its age, and of early sexual maturity. Some breeders are inclined to have the first calf dropped at a rather early age, claiming in a way to fix a habit of milk production, also securing early financial returns. These animals are allowed to drop their second calf 18 to 20 months later, developing a long milking period. It is questionable whether this method is advisable. Its advocates state that by allowing a longer period between first and second calves, they will have time to grow before the second calf is dropped, but the severe strain of a lactation period does not allow of much energy being devoted to building up the body, unless the heifer is allowed to dry off sometime before calving. Breeding too

young undoubtedly results in small cows, and it is impossible for a young cow to digest a sufficient amount of food to produce milk and growth at the same time. The production of milk in a dairy heifer is the dominant function, and will not be materially checked to allow growth to continue. A cow that calves young usually shows more pronounced feminine characteristics than one that has calved later.

From data supplied by the Agricultural University of America it has been found that the higher milk producers are those that have calved between the ages of 26 to 30 months. It is a great strain on a heifer to develop a foetus, and from investigations it has been found that a heifer does not materially add to her own body during the last three months of pregnancy, even if liberally fed.

Development of Dairy Heifer.

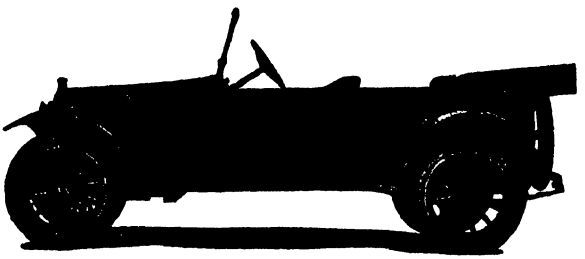
As stated, the important factor necessary for economical milk supply is the individuality of the cow used, and this is mostly dependent on inheritance. Still, the effect of the manner of raising heifers has to be taken into consideration to a very great extent. The poorly developed heifer cannot be expected to make a high producing cow, no matter what her inheritance is.

Allowing Heifers to Become Over-fat when Young.

It has been believed for a long time by many breeders that it is injurious to the milking qualities of a dairy cow for her to become fat when young. This has been thought to develop a tendency towards using feed for body fat which will persist when the animal is in milk and matured.

When a dairy cow lacks dairying qualities, and shows a beef tendency in conformation, it is easy to attribute it to improper feeding when young. It will generally be found that these animals show a distinct tendency to beef when young, but it is not due to improper feeding, but an inherited characteristic. The heavy feeding of a heifer showing distinct dairying tendencies is not injurious to its milk producing functions. Those heifers that have been kept fat from birth until they come into milk lose surplus body fat within a very short time after calving, and show no more tendency to fatten later while in milk than do those fed on a light ration. The marked effect of heavy grain feeding is more rapid growth and earlier maturity. However, the heavy rationing of heifers may prove too expensive, and cannot be practised.

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Bulky Rations.

With a great majority of breeders it is considered that the feeding of bulky rations while young influences the digestion of a matured cow. It has been observed that a heifer that has been receiving a heavy grain ration does not eat as much roughage when first put on a typical dairy ration. This difference disappears in time, and later on one is unable to observe the difference in the power of digestion. The digestive system has great power of adapting itself to the character of the food consumed.

Handling a Heifer.

It is a very good plan to handle a heifer before she comes into milk. She should be at times tied up and fed in the cow shed where she is to be milked later on. Thus, getting a heifer accustomed to surroundings will tend to make her quiet, and when brought into milk for the first time she will be of little trouble.

Care at Calving Time.

The care at calving time should be the same with all animals, whether matured cow or heifer. If she is in good heart, seldom will any complications arise. If the cow is on pasture she should be allowed to remain there, but she should be looked to at least twice a day when about to calve. If she is used to being stalled, it is advisable to turn her in to a good, clean, roomy, loose box, with a good bed of clean straw. Special care should be taken against infection of the navel of the calf and bringing on contagious scours. As the time of parturition approaches, the udder becomes distended and hard, and fills with colostrum. This introduces the question whether a cow should be milked before calving, but if milking is begun it should be continued regularly, but only in extreme cases, when there is evidence of great suffering through the distention of the udder, should a cow be milked before calving. When the tendons and muscles relax on either side of the rump, leaving a hollow appearance on either side of the tail head, parturition may be expected within 24 hours or three or four days at the most.

The cow should be left strictly alone at the time of calving unless some assistance is evidently necessary. As a rule, a calf will be born within half an hour of showing the first signs. If the calf is not expelled after an hour or two, an examination should be made. The normal position of the calf at the time of delivery is fore feet first with the front of the hoofs and knees upwards, while the nose lies between the knees. If the condition of the calf is normal, the cow may be assisted by pulling on the fore feet in an outward and downward direction. This should be done carefully, and when the cow

strains. If the condition is abnormal, the help of an experienced man or veterinary surgeon should be obtained as quickly as possible, for the sooner a job of this description is taken in hand the easier it will be for the operator.

After-birth.

The cow is subject to retention of the after-birth, and special attention should be given to see that this comes away. When a cow is in good condition, the after-birth is usually expelled within a few hours of calving, sometimes immediately. Cows in low condition, and those getting up in years, also unhealthy cows, are more subjected to retention of the after-birth. Giving cold water immediately after calving may cause it to be retained. The after-birth, when expelled, should be removed so as to prevent the cow from following her instinct and eating it, which may result in disorder of the alimentary canal. If the after-birth is not expelled, a serious condition is brought about by the decomposition of the tissues within the body, and the absorption of poisons. The cow loses flesh and produces very little milk. The condition is recognised by the fetid products that escape, and the offensive odours.

The cow should be handled to prevent the retention as much as possible, by giving a drench of Epsom salts before and after calving, or warm bran mashes; better still, a mash made of two-thirds bran and one-third crushed oats. The oats act as a stimulating agent. If it does not come away within 24 hours, it should be removed by hand. There are no drugs that can be used for the purpose. If taken in time or when it is not attached to any extent, it may be removed by gently pulling with the hands, or by winding the after-birth around a stick as it comes out. The tying on of weights is not to be recommended, as it often causes breaking off before the whole of it has been removed. Every man having the responsibility of caring for cows should acquire the experience necessary to attend to cases of this nature. The operation should be taken in hand as soon as it is noticed that it is being retained or within 24 hours, as the mouth of the womb may become closed, making it difficult to introduce the hand. The arm of the operator should be lubricated with disinfecting oil as a protection against infection. The tail should be held to one side by an assistant, while the right arm should passed along the right side of the vagina and womb until the operator reaches the first cotyledon to which the membrane remains attached, and remove all attachments, &c.

Care of Cow After Calving.

It should be borne in mind that the vitality of a cow is low following parturition, and she should be treated accordingly. The rations for the first few days should be light in character, and not very abundant. Bran mashes, or a mash of two parts bran and one of oats

satisfactorily supply the grain portion. If the udder is hard, the grain should be increased very slowly until the condition disappears. Then more feed can be added, taking as a rule two or three weeks to get her on full ration.

To economically feed a cow, she should be studied as to her individual likes and dislikes (but generally speaking, a cow quickly accustoms herself to almost any kind of good fodder), also to the quantity of milk she is producing. The same ration will not do for, say, one cow giving three gallons of milk per day, and another giving five gallons. The ration should be sufficiently bulky to overcome the craving of a large stomach, and should contain the different nutrients in sufficient quantities without wastage. When studying the question of feeding cattle, there are several factors of importance that must be taken into consideration. In winter weather, warmth and shelter are necessary in the production of milk. If cattle are exposed to cold and rough conditions they must be given more food, or else part of the food that is given under favorable conditions will be used for the maintenance of body heat, leaving very much less for the manufacture of milk. This directs attention to the necessity for some form of shelter for the cows, such as sheds, trees, hedges, &c. A good and economical method of feeding, which will not entail any undue labor or a great deal of knowledge, is to supply the cow with as much bulky food as she will consume, and about 3lbs. of grain mixture at first. The grain mixture may be made up of bran, crushed oats, linseed meal, or any of the concentrates used in feeding milking stock. Gradually increase the grain by ½lb. each day, until the cow does not respond to the feeding. Then gradually decrease the concentrates, and very often it will be noticed that the cow is again likely to improve in production. The amount of food given on the day which she begins to fall off in quantity will generally be found to act as a guide as to the amount required by the cow. When cows are on good pasture, the same amount of grain will not be necessary as when cows are being hand fed.

Records.

All dates and records should be carefully kept. Especially reference should be made to dates of service of the bull, for without such a record it is impossible to tell with any accuracy when calving will take place, and in all probability the animal will still be producing milk when she should be having a rest in preparation for next calving.

All good milk-producing cows should have a calf at least once a year. Only in special cases in which yearly records of stud stock are required should the period be extended. Then the cow should not be allowed to go beyond 15 months.

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Do not hesitate! It costs nothing to inquire.

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Drying off Cows.

When certain cows are milked continuously, it is sometimes claimed that they cannot be dried up. There is very little difficulty about this if the cows are properly handled. The common method of drying a cow is to lengthen the interval between milkings by omitting one milking each day. After a few days the milk is only drawn once in two days until secretion is stopped. If a cow is producing as little as 10lbs. of milk per day, milking can be stopped at any time, and no harm will result. If a cow is producing more than this amount, her grain ration should be cut out, and she should be fed only on hay. When dry, she can again be given a cooling ration, the grain being principally bran and crushed oats.

Common Diseases.

Indigestion.—This is generally due to eating unpalatable foods such as mouldy hay, &c., immediately feeding a heavy ration after calving, or drinking extremely cold water. The symptoms noticed are refusal of food, also failure of the cow to chew its cud. The bowels refuse to operate, although in some cases acute diarrhœa may be caused by indigestion. 1lb. to 1½lbs. of Epsom salts with 1oz. to 2ozs. of ground ginger will generally put the cow right. When the cow has recovered sufficiently to eat, appetising foods and bran mashes should be given. Ordinary scour in calves is simply digestive disorder, generally brought about by irregularity in feeding. The best treatment is to reduce the food and give a tablespoonful of castor oil in order to rectify the bowels.

Bloat or Hoven.—This is caused by sudden changes from dry to large quantities of green feed, more especially plants of a leguminous nature. Any condition of food that causes an unusual amount of fermentation, so that the gases formed are created faster than the blood can carry them off, will generally cause bloat. If the case is not extreme, it may be sufficient to drive the animal at a walk for a quarter of an hour. In some cases, placing a tarry or greasy rope in the mouth and tying the ends to the horns is effective. The efforts of the animal to dislodge this object stimulates the secretion of saliva and swallowing, in swallowing the gases escape. In severe and urgent cases the use of the trocar and cannula should be resorted to. The animal should be tapped on the left side, half way between the hip and last rib, with the trocar pointing towards the heart. An ordinary pocket knife may be use if no trocar is on hand. The cannula is more desirable, because it retains the opening, and allows the gases to pass off as they form.

CONGESTION OF THE UDDER.

Congestion of the Udder.—In most cases with heavy milkers, before and just after calving, the udder is enlarged, hot, and tender, with a slight swelling extending along the abdomen. This congested state generally disappears in a day or so, and normal condition can be hastened by allowing the calf to remain with the cow, but at the same time milking her out three or four times a day. If the condition is persistent, massage the udder with camphorated oil, or a mixture of camphor and lard, one to four. This condition may be caused by a chill in the udder, sometimes producing bloody milk. An early treatment, and one that will be found beneficial, is a dose of Epsom salts, followed by a tablespoonful of saltpetre on three successive days.

Teat Trouble.—Sore teats, due to cracks, &c., should be treated with an ointment composed of 8ozs. of lard, 2ozs. vaseline, 2ozs. of camphor, and 2ozs. of boracic acid. In case of hard milkers, the use of teat plugs, which will stretch the sphincter muscle at the end of the teat, will tend to make the cow milk easier. If milking tubes are used, great care should be exercised. They should be perfectly clean, to prevent any infection of the udder by their use. A bistoury can also be used for cutting this muscle, and results are sometimes satisfactory. This operation should be conducted under the supervision of a veterinary surgeon.

Cowpox.— This is not generally serious. However, it can be easily spread from one cow to another by the milker, so a cow having cowpox should be milked last. It is present in the form of blisters containing yellowish fluid which gradually dries up, leaving a scaly surface. A good remedy is to wash the udder well with warm water and soap, dry thoroughly, and apply boracic or fine ointment.

Milk Fever.—This is not, strictly speaking, a fever, as the temperature of the animal is lower instead of higher. The disease occurs after calving, and generally in cases of high producing and plethoric animals. It is caused by a disturbance in the circulation of the animal, and often follows easy and bloodless calving.

Sucking Cows.—Some cows develop the habit of sucking themselves or other cows. Devices such as muzzles with sharp nails are rather dangerous, and may cause injury to the udder. A simple method is to place a ring in the nose, with one or two rings attached. They need no attention and do not interfere with the animal's feeding, but interfere with the animal sucking.

DAIRY CATTLE IMPROVEMENT ACT.

A dairyman may purchase a bull for £100, and immediately secure from the Government a free gift of £60 by conforming to conditions laid down in the regulations under the Dairy Cattle Improvement Act, 1921. These regulations, which were approved by the Government in December, 1923, require the Minister of Agriculture to offer to the approved purchaser of any such bull as complies with the conditions set out in the Act, a subsidy of 60 per cent. of the purchase price at the time the animal is purchased, or as soon after as can be arranged, provided that the subsidy shall not exceed £60. This subsidy can be claimed on bulls purchased at auction sales, by private treaty, or at special auction sales arranged by the Government under the provisions of this Act. Arrangements are in progress for a sale to be held at Murray Bridge during March, and full particulars of this are available on application to the Director of Agriculture.

The conditions under which a subsidy can be claimed are as follows:—

1. The bull must have passed a tuberculin test by a Government veterinary officer within six months prior to date of sales.
2. The bull must be in good health, well grown, and true to type.
3. The vendor of any bull shall produce concerning such bull a declaration of health on a form to be supplied by the Department of Agriculture.
4. The bull shall be not less than 10 months old, and not more than five years old.
5. The vendor of any bull two years old and over must produce evidence of fruitfulness in the preceding year.
6. The bull shall be registered in herd books or be eligible for herd book entry.
7. The bull shall be the progeny of officially tested stock reaching the undermentioned butterfat standards during 273 days milking:—

Junior, two years old	200lbs. butterfat
Senior, two years old	225lbs. butterfat
Junior, three years old	250lbs. butterfat
Senior, three years old	275lbs. butterfat
Junior, four years old	300lbs. butterfat
Senior, four years old	325lbs. butterfat
Mature cows	350lbs. butterfat

(*a*) If a cow or heifer fails to reach the standard, but subsequently attains it as set for her age, her progeny may, upon the decision of the Advisory Committee for the Improvement of Dairying, thereby be rendered eligible.

(*b*) Any cow or heifer reaching the 350lbs. butterfat standard, need not be tested for more than one year.

In this regulation a junior animal in each class is one which at date of calving has not attained to 2½, 3½, or 4½ years respectively, and a senior animal is one which at date of calving has attained or is over 2½, 3½, or 4½, but less than 3, 4, or 5 years respectively.

8. The purchaser's application for subsidy shall be made on forms supplied at the sale and indorsed by the auctioneer (if any) and a Government representative.

9. Any bull in respect of which the purchaser has received a subsidy as aforesaid shall, if required, be made available for use to others at a fee not exceeding 10s. per cow. In the case of bulls under two years of age at date of purchase, the owner need not accept more than 15 outside cows during the first year, nor more than 25 cows for bulls two years or over. Failure to comply with this condition owing to an insufficient number of outside cows being available will not invalidate the purchaser's right to the subsidy.

10. The purchaser of a bull shall have the right to refuse the services of such bull for any cows which he may have reason to believe to be suffering from disease, provided that the owner of such cows may appeal to the Director of Agriculture to decide whether any of such cows is suffering from disease

11. The purchaser shall submit to the Director of Agriculture at the expiration of 12 months after purchase—

(*a*) A declaration of health on a form procurable at the Department of Agriculture.

(*b*) Signed statements from the owners of all outside cows served and dates of service in accordance with condition 9.

12. The bull shall be kept under conditions satisfactory to the Department of Agriculture.

13. Any purchaser of a bull who receives a subsidy as hereinbefore mentioned, and who commits a breach of any of these regulations, shall be guilty of an offence, and shall be liable to a penalty not exceeding £10.

EXPORT OF FRUIT.

The Horticultural Instructor (Mr. Geo. Quinn) supplies the following information respecting Customs regulations dealing with the export of fruit:—

Packing.

154. I. Apples or pears intended for export shall be packed in accordance with the following provisions:—

(*a*) The fruit shall be packed only in cases or trays of the following dimensions:—

Cases for Apples or Pears.

Description of Case.	Internal Measurements (Inches).
Australian bushel	18 x 14¼ x 8⅝
Canadian bushel	20 x 10 x 11⅛
Flat bushel	26 x 14¼ x 6 (clear of divisions)
Canadian standard	18 x 10½ x 11½
Three-quarter flat bushel	24 x 11⅜ x 6 (clear of divisions)
Australian half bushel	18 x 8⅝ x 7¼
Half flat bushel	26 x 7½ x 6 (clear of divisions)

Trays for Pears.

Internal Measurements (Inches).

18 x 3¼ x 14¼, or
18 x 2⅞ x 14¼, or
18 x 2½ x 14¼

Provided that those dimensions may show a variation to the extent of not more than 10 per centum (that is, 5 per centum under or 5 per centum above) on the total cubic capacity of the case.

(*b*) The fruit shall be packed in clean, new cases constructed of well seasoned softwood or hardwood that has been smoothly sawn or dressed in an approved manner, and, in the opinion of the collector, sufficiently strong to withstand such handling as is ordinarily incidental to transport to destinations beyond the Commonwealth.

GRADE STANDARDS.

154. Ia. Apples or pears intended for export shall comply with the following conditions:—

(*a*) The outer layers or shown surfaces of the apples or pears—whether described as "Special," "Standard," or "Plain"—shall be a true indication of the average grade of the contents of the case.

(*b*) Apples or pears described as "Special" shall consist of sound, clean, well-formed apples or pears of one size and one variety free from broken skins and from disease. Superficial blemishes caused by hail marks, limb rubs, and sprays shall not be allowed to a greater extent than 5 per centum (by number) of the total fruit in any case. The fruit shall not measure less than 2¼in. in diameter, and shall be of good color for the variety.

(*c*) Apples or pears described as "Standard" shall consist of sound, clean, well-formed apples or pears of one size and one variety free from broken skins and from serious blemishes, but fruit slightly blemished by rubbing, black spot, fungus, or caterpillars may be exported, provided that—

(*i.*) The proportion of such fruit does not exceed 10 per centum (by number) of the apples or pears in any case.

(*ii.*) The total area covered by such blemishes on any apple or pear does not exceed the area contained in a circle having a diameter of ¼in.

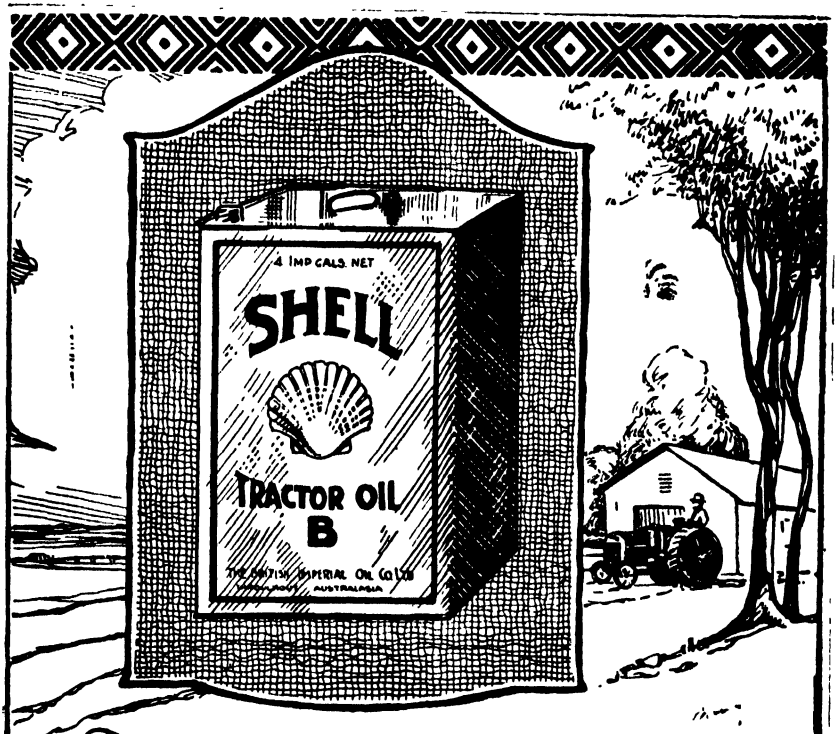
Russeting of the surface shall not be deemed to be a blemish if the skin is unbroken. The fruit shall be not less than 2¼in. in diameter, except in the case of varieties which, in the opinion of the collector, may be regarded as normally small, in which case the fruit shall be not less than 2in. in diameter.

(*d*) Apples or pears described as "Plain" shall consist of apples or pears of one variety and one size free from broken skins, and not seriously blemished or injured by any disease, but fruit slightly blemished by rubbing, black spot, fungus, or caterpillars may be exported, provided that—

(*i.*) The proportion of such fruit does not exceed 30 per centum (by number) of the apples or pears in any case.

(*ii.*) The total area covered by such blemishes on any apple or pear does not exceed the area contained in a circle having a diameter of ¼in.

Russeting of the surface shall not be deemed to be a blemish if the skin is unbroken. In the case of apples the diameter shall be not less than 2in.



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RIVER MURRAY HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR DECEMBER, 1923.

Herd No.	Average No. of Cows in Herd.	Average No of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during December.	Per Cow during December.	Per Cow October to December.	Per Herd during December.	Per Cow during December.	Per Cow October to December
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1/C	31·03	28 26	26,597·5	857·15	2,502·54	1,011·18	32.59	92·49
1/J	20	15	10,430·5	521·53	1,554·25	456·34	22·82	70·08
1/L	19·55	17·55	12,088·5	594·96	2,150·15	495·38	24·33	90·28
1/M	21·74	15·35	9,046·5	416·12	1,159·97	455·80	20·97	59·73
1/R	18	18	9,579	532·17	1,729·45	429·42	23·86	80·35
1/T	14	8·52	4,873·5	348·11	1,389·21	251·16	17·94	72·52
1/W	17	16·35	8,348	491·06	1,640·99	319·14	18·77	63·15
1/Y	19	16·94	11,107	584·57	1,905·17	495·25	26·06	88·28
1/Z	21	16·87	9,567·5	456·03	1,730·79	405·07	19·29	79·92
1/Cc	22·39	20·39	10,783	481·59	1,632·18	474·13	21·18	69·22
1/Dd	21	20·61	12,367·5	588·93	1,945·03	533·25	25·39	84·72
1/Ee	11	11	7,672·5	697·50	2,052·65	337·54	30·69	94·04
1/Ff	12	12	8,432	702·67	2,275·96	313·20	26·10	93·43
1/Gg	11	10	8,339	758·09	2,266·78	362·89	32·99	103·59
1/Hh	13	12·42	9,477·5	729·03	2,220·51	399·95	30·77	93·19
1/Ii	13	11·10	8,051·5	619·34	1,999·69	339·86	26·14	83·04
1/Jj	15	11·10	8,230	548·67	1,554·80	353·91	23·59	67·10
1/Kk	14	12·45	12,184·5	870·32	1,850·71	500·45	35·75	81·32
1/Ll	11·10	11·10	6,506	586·12	1,751·89	252·70	22·77	80·09
1/Mm	15·97	15·97	9,506	595·24	1,803·71	459·80	28·79	84·07
Means	17·04	15·05	10,158·38	596·18	1,855·68	432·32	25·37	80·73

RIVER MURRAY HERD TESTING ASSOCIATION.

List of cows yielding over either 1,000galls. milk or 400lbs. of butterfat during one lactation period.

Owner.	Name of Cow.	Days in Milk.	Milk.	Butter-fat.
			Lbs.	Lbs.
C. J. Morris, Monteith	Diana	319	10,119·5	389·42
	Ivy	297	16,850	590·04
M. S. Cheetham, Mypolonga	Cleo	319	10,021	422·62

MOUNT GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR DECEMBER, 1923.

Herd No.	Average No. of Cows in Herd	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during December	Per Cow during December.	Per Cow August to December.	Per Herd during December.	Per Cow during December.	Per Cow August to December.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
2/A	15	15	10,292	686·13	2,788·79	415·38	27·70	107 02
2/B	8·90	8·10	7,442·5	836·24	4,508·61	291·00	32·70	151·26
2/C	17·48	13·81	9,366	534·10	2,867·66	387·85	22·19	104·29
2/E	13 71	13	10,764·5	785·16	3,311·73	453·38	33·07	137·21
2/H	23	22 81	17,351	754·39	3,518·96	708 56	30·81	132·10
2/I	14	14	11,361 5	811·53	3,650 42	457·08	32·65	135·56
2/J	12	12	12.028	1,002·33	4,563·68	473·29	39·44	178·99
2/K	24	22·32	18,426	767·75	3,229·91	689·31	28·72	117·08
2/L	24	19·58	11,335	472·29	2,065·54	538 29	22·43	88·90
2/O	36	31 52	19,357	537·69	2,770 53	748·85	20·80	103·49
2/R	16	16	17,313·5	1,082·09	5,375·75	682·54	42·66	209·09
2/S	6	5	5,347 5	891·25	4,053 95	214·54	35·76	181·37
2/T	12	9 39	8,909	742·42	3,991·09	311·69	25·97	146·30
2/U	17	17	17,034·5	1,002·03	4,394·39	681·46	40·09	168·34
2/V	20 19	20·03	12,583	623·22	2,523 24	514·22	25·47	99·83
2/W	17	17	17,158·5	1,009·32	4,861·40	641·72	37·75	171·14
2/X	34·94	33 61	31,648	905·78	4,086·94	1,258·32	36 01	144·92
2/Y	12·58	11·94	10,747·5	854·33	4,154 50	432·42	34·37	161·35
2/Z	11·29	10 29	8,360	740·47	3,425·02	349·21	30·93	134·25
2/AA	24·97	24·03	15,712 5	629·35	3,057 86	609·67	24·42	112·45
2/BB	9	9	6,618·5	735·39	3,099 94	275·65	30·63	113·08
2/CC	13	13	7,161	550·85	2,646 51	315·12	24·24	107·18
Means	17·37	16 29	13·013·05	749·32	3,449 00	520·43	29·97	130·49

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CLENCOE HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR DECEMBER, 1923.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during December.	Per Cow during December.	Per Cow October to December.	Per Herd during December.	Per Cow during December.	Per Cow October to December.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
3/A	17	14·48	17,543	1,031·94	2,818·19	741·98	43·65	113·93
3/B	16	14·06	8,472	529·50	1,315·49	368·07	23·00	54·21
3/C	12	12	10,261	855·08	2,618·72	400·05	33·34	99·60
3/D	12	8·61	7,312·5	609·37	1,468·25	263·74	21·98	52·89
3/E	15·84	13·35	9,384·5	592·45	1,897·74	420·85	26·57	78·38
3/F	8·42	8·42	6,700	795·72	2,217·97	265·57	31·54	82·26
3/G	10	8·84	8,564·5	856·45	2,457·45	345·65	34·57	88·80
3/H	14·61	13·81	10,608·5	726·11	1,903·63	389·77	26·68	65·72
3/I	12·68	12·68	9,669	762·54	2,082·54	406·38	32·05	81 93
3/J	14	13	7,006	500·43	1,294·83	306·50	21·89	55·51
3/K	23·39	21·84	16,115·5	688·99	2,185·79	704·95	30·14	86·27
3/L	18	18	12,431	690·61	1,931·89	531·80	29·54	70·11
3/M	12	12	7,719	643·25	1,910·54	331·18	27·60	75·98
3/N	19·90	18·52	12,292·5	617·71	1,791·59	539·39	27·11	71·69
3/O	16	13	8,494	530·87	1,497·62	314·47	19·65	52·66
3/P	14	14	9,393	670·93	2,130·00	364·32	26·02	79·13
3/Q	57·52	53·74	44,954	781·54	2,195·61	1,801·52	31·32	85·00
3/R	17	17	12,245	720·29	2,380·29	548·81	32·28	100·58
Means	17·24	15·96	12,175·83	706·16	2,030·91	502·50	29·14	78·82

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ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Monday, January 21st, 1924, there being present—Mr. F. Coleman (Acting Chairman), Professor Arthur J. Perkins, Col. Rowell, Messrs. C. J. Tuckwell, H. Wicks, L. Cowan, B.Sc. (Agric.), W. J. Colebatch, A. M. Dawkins, and the Secretary (Mr. H. J. Finnis).

Variation in Size of Cornsacks.—At the 1923 Congress a resolution was carried "that steps should be taken to prevent the inclusion of bags of other than standard size in bales of cornsacks." The matter was referred to the Commonwealth Department of Trades and Customs, who supplied the following report:—"Instructions have been issued from time to time to insure that the utmost care be observed with respect to the importation of cornsacks. Samples are taken from each consignment received in order to ascertain whether they comply with the requirements of the Proclamation. The Department points out that it is impossible to examine every bale, but everything that is reasonable is done to protect the importers. In several instances consignments have been detained on account of non-compliance with the terms of the Proclamation.

Planting Trees on Stock Reserves.—The 1923 Congress of the Agricultural Bureau resolved:—"That the Government be urged to evolve some scheme for planting tress on stock reserves." The Conservator of Forests, to whom the matter was submitted, has supplied the following report:—"The position in this matter is that the planting of stock reserves is surrounded by many weighty disadvantages, and offers no chance for any satisfactory return from a financial standpoint. One great disadvantage arises from the fact that the width of the land usually available does not exceed a quarter of a mile, hence it follows that when allowance is made for a one-chain road on one side and a two-chain road on another (which has been the usual practice), there remains only 17 chains as the width of the land available. This width is out of all proportion to the length, as the reserves usually extend for many miles in succession. If an area one mile long by 17 chains wide be fenced, the length of fencing will be nearly 200 chains, which at £60 per mile will amount to 22s. per acre for the 136 acres enclosed. It is usual, however, to lay out the area to be planted in, as regular a form as possible, and this being so, if the area to be fenced were 640 acres with a boundary of a mile long on all four sides, then the fencing cost at the same rate would only amount to 7s. 6d. per acre for the 640 acres enclosed. The great discrepancy inseparably associated with the contour of the land under consideration is thus apparent. The same reason that so greatly increases the cost of fencing also adds exceedingly to the cost of maintenance and oversight, as so much more travelling and patrolling is necessary owing to the indefinitely prolonged length of the area to be operated on. Residential centres would be imperatively needed at suitable intervals, as it would be futile to leave plantations—started at heavy cost—to the mercy of the many petty trespasses and injuries

that invariably occur if areas of this kind are left without adequate protection and oversight. Again, it will be self evident that the cost of transport of all materials for fencing, planting, and other purposes, especially where a residence is needed, cannot fail to be exceedingly heavy, and the crux of the whole matter is, that in spite of all the expenditure involved, there is no hope whatever of any plantations reared in this way ever returning more than a bare fraction of the cost. It must be further noted that a large number of the stock reserves now existing are situated in localities where both climate and soil condition are absolutely hostile to the growth of timber. Areas planted by the Department under similar circumstances years ago at Redhill, Barunga, Crystal Brook, Ayers, and Yarcowie, when labor and all other costs were far cheaper than they are now, have never given a satisfactory result from a financial point of view. They may certainly have possibly afforded an object lesson to the general public as to how and what to plant, but that is no compensation for the very heavy dead weight they have always proved to be on the Department's funds. Having fully considered this matter from the planting aspect, it is now necessary to regard it from the most prominent point, namely, how planting, if carried out, would affect the main object for which these reserves were created. As the movements of stock are of vital importance to one of the country's main lines of production, travelling stock reserves were set apart for the travelling of stock to various purchasing centres, and cannot be diverted from their original purpose without the consent of both Houses of Parliament. Strong opposition would certainly be experienced from the large body of stockholders concerned to any action in this direction, even if there were any prospects of valuable results being obtained by planting, but when it is abundantly clear that no good end can be attained, it would be highly undesirable to start planting operations on these reserves. Bearing all these considerations in mind, I do not feel justified in recommending that any scheme for planting the stock reserves should be entertained."

Red Wheats.—The 1923 Conference of Murray Lands Branches of the Agricultural Bureau resolved:—"That the Department of Agriculture compile and publish a list of 'red' varieties of wheat, and of 'white' varieties which are likely to prove efficient substitutes for same. The Superintendent of Experimental Work (Mr. W. J. Spafford) to whom this matter was submitted supplied the following information:—"In the Institute of Science and Industry Bulletin, No. 26 (A Classified and Detailed Description of the More Important Wheats of Australia), 82 wheats have been dealt with, and of these the following nine are the only ones which may be described as 'red' wheats:—King's Red, Teakle's Red, Cedar, Marquis, Bomen, Warden, American Eight, Hayne's Bluestem, Dawson's Golden Chaff. Other than the above, Red Russian is the only other 'red' variety grown to any extent in this State, and as a matter of fact there is not much 'red' wheat produced in South Australia, and the great bulk of it would consist of King's Red and Red Russian, both of which varieties could be well replaced by King's White, Sultan, Gluyas, Baroota Wonder, or Walker's Wonder.

Standard Fruit Case.—A suggestion was received that it be made compulsory that friut cases should be manufactured with soft wood ends. It was decided to seek the opinion of the Fruit Growers' Association on this proposal.

Reports of Refrigeration of Fruit.—The following resolution was carried at the Conference of Hills Branches:—"That reports of the investigations recently carried out relative to the refrigeration of fresh fruit be forwarded to all Branches of the Agricultural Bureau interested in the exportation of apples" The Secretary reported that copies of the report referred to in the resolution were published at 4s. 6d. each. It was decided that Branches interested in the exportation of apples should be advised that copies of the report would be made available on the payment of the cost of procuring same.

Distribution of Seed Wheat.—A communication was received from the Owen Branch asking, "That the Government adopt the New South Wales system of distribution of seed wheat." The Secretary explained that the resolution probably referred to the practice which prevailed in New South Wales, where farmers who were desirous of selling seed wheat could have their crops inspected by an officer of the Department of Agriculture. If favourably reported on, a notice was published in the New South Wales Agricultural Gazette drawing attention to the fact that good, clean, and true to type seed could be obtained from that farmer. The Board recognized that the adoption of that system in South Australia would mean an increase in the

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work of the technical staff of the Department to cope with the inspection of the crops, but decided to recommend it to the Government as the best method that had come under their notice of increasing the quantity of seed available to farmers.

Confidence in Departmental Officers.—The following resolution was received from the Coomandook Branch:—"That the members of this Branch of the Agricultural Bureau generally regret the unwarranted attacks made recently in Parliament on the Agricultural Department. Our experience has been that the Director of Agriculture and other members of the staff have promptly responded to every request from us for advice and addresses." The Secretary was instructed to thank the Branch for their expression of confidence.

Drainage of the Berri Orchard.—At a recent meeting of the Berri Branch it was resolved:—"That the Department of Agriculture be urged to use all expedition in draining that portion of the Berri Orchard under vine manurial experiments as the spread of seepage now visible will seriously affect the value of the experiments being so ably conducted by Mr. Savage." The Secretary was instructed to advise the Branch that the work is already in hand.

Interstate Departmental Officers at Country Conferences.—A communication was received from the Lone Gum and Monash Branch asking what action was taken by the Advisory Board in securing the attendance of officers of the Departments of Agriculture of other States at Agricultural Bureau Conferences. It was decided that the Branch should be informed that the members of the Mildura Research Committee who attended the River Murray Conference, which was probably the case which the Branch had in mind, were present at the express wish of the Renmark Branch of the Agricultural Bureau.

Inspection of Apple Packing Sheds.—It was decided to refer the request of the Balhannah Branch that the Government arrange for inspection in packing sheds of apples for export to the Horticultural Instructor for a report.

Underground Water Supplies for Irrigation.—The Tantanoola Branch requested that an expert be sent to this locality to report on "the feasibility of utilising the millions of gallons of water now running to waste" for summer irrigation, and to advise the Department as to whether an experimental plot might not be possible to demonstrate the potentialities of the district in this respect. The Secretary was instructed to confer with the Director in order that a reply to the reqeuest might be forwarded to the Branch.

Cold Storage of Dried Fruits.—Mr. C. J. Tuckwell in bringing the matter of the cold storage of dried fruit under the notice of the Board said:—It was recently stated in the press that it was proposed in England to try cold storage as a deterrent of the grubs that affect dried fruits. In October last the London quotation for three-crown Australian sultanas was 58s. per cwt. sellers. Speaking from memory he thought that sales were not effected until the price came down to about 50s. By the time freight and charges and 10s. per cwt. duty were paid there was precious little left for the growers

but a bad reputation with the British consumer. The fruit was reported as "maggotty." The months of greatest demand for sultanas, currants, and lexias were November and December. In December, 1922, he saw Australian sultanas in grocers' windows in London quite candied and showing at a decided disadvantage against the fresh-looking goods from the Mediterranean, which had recently arrived on the market. His experience had been that in South Australia the grubs did not appear in the fruit until about the end of the year. The voyage through the tropics and the summer weather on arrival in England evidently favoured the earlier hatching of the eggs. It seemed feasible that cold storage in transit and at the other end would prevent the eggs from hatching; and if, until the winter, say November, fruit were only taken from cold store as it was required, there should not be any trouble with grubs. During the English winter the eggs were not likely to hatch. In addition to checking the grubs it was possible that cold storage would prevent the fruit becoming candied. The dried fruit industry was of such importance to South Australia that he thought experiments dealing with the matter should be carried out. To make a thorough test, arrangements should be made with one of the packing sheds to have a homogeneous sample of sultanas packed in a number of cases, not necessarily so large as 56lbs. each, and such arrangements should be made at once, as the fruit season was approaching There should be sufficient cases to test storage at different temperatures, such as in apple chambers and meat chambers; also that different boxes could be opened and examined after various periods of storage. The extra cost of marketing cold-stored fruit should be ascertained. Any steps likely to improve the condition of dried fruit when it reached the market were of such vital importance to soldier settlement on the Murray that the matter should be treated as urgent. It was decided to ask the Horticultural Instructor for a report on the matter.

Welcome to Mr. Cowan.—The Chairman extended a welcome to Mr. L. Cowan—a member of the Board who has recently been on an extended tour of other countries.

Life Membership.—The name of Mr. J. Potter, of the Clarendon Branch, was added to the roll of Life Members of the Agricultural Bureau.

New Members.—The following names were added to the rolls of existing Branches:—Waikerie—A. Jones, G. M. Arnold, A. R. Thompson, R. G. Gill, K. P. Thompson, E. J. Burrows, F. S. Oldhin, E. Francies; Roberts and Verran—W. H. Whittaker; Mannanarie—F. M. Frost, T. A. Quinn, C. N. Bretag; Allandale East—C. D. C. Kennedy; Mundalla—R. Saxon, S. S. Sanderson; Coonalpyn—C. J. S. Carpenter; Barmera—H. H. McCarthy, D. S. Murphy, A. C. George; Rapid Bay—N. Mathew, H. Cole, W. Collins, Rev. Lawson; Light's Pass—G. A. Bender; Winkie—E. C. Goodrich; Rapid Bay—A. Stacey; Balhannah—A. W. Mattner; McLaren Flat—A. Fraser, G. Bell, C. Chapman; Kringin—E. C. Thompson, A. F. Hurford; Whyte-Yarcowie—S. Napper; Tantanoola—W. R. Warren, H. Kennedy.

ORCHARD NOTES FOR SOUTHERN DISTRICTS FOR FEBRUARY, 1924.

[By C. H. BEAUMONT, Instructor and Inspector.]

February should be the month of results. Some of the soft fruits will have been dealt with, and the time comes for packing for export. Apples are the main export line so far. There is still room for great improvement in picking and packing We must get the fact before us that it is the consumer that matters; if he is satisfied there is increased demand, and there is a lessened demand when the pack opens up badly. I have had the opportunity of seeing Californian apples handled, graded, and packed, and I must admit that we do not approach their standard. They have good, well made boxes; they have well equipped packing sheds, and only good grade fruit is sent in by the growers. The boxes are attractive and the fruit in them is true to the brand on the box. The best fruit is available for their own people, who do not fail to send in big orders, knowing that they may rely on getting the fruit they send for and pay for. I handled thousands of apples and did not find a grubby one or a scabby one. We have fruit which is equal in every way to theirs; they have just as many diseases to contend with as we have, and there is no reason why we should not market as good or better samples than they do. The wonderful method of co-operation is a great factor in the successful handling of the fruit crop.

Keep on spraying apples of late varieties to protect them from codlin; use a high pressure pump and well mixed material. Arsenate of lead powder is the best material we have used, and if a little flour is added (4lbs. per 100galls.) it will spread better and be more efficient.

Ripe, soft fruit should be picked on to trays for immediate sale.

Mark the trees bearing the best fruit so that you will know where to go for grafting wood.

Citrus trees and young or newly planted trees will need water. Give them as much as the soil will soak up readily and remain friable, but not enough to make it boggy. Loosen the soil as soon as possible after irrigation.

Watch vines for oidium and use the finest sulphur for dusting, or lime-sulphur spray. Against downy mildew Bordeaux mixture is the preventive.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., DECEMBER, 1923.

IMPORTS

Interstate.

Apples (bushels)	1,791
Bananas (bushels)	7,875
Cherries (bushels)	2
Cucumbers (bushels)	105
Gooseberriies (packages)	2
Lemons (packages)	4
Oranges (bushels)	4
Passion fruit (bushels)	13
Peaches (packages)	3
Plums (packages)	1
Peanuts (packages)	3
Onions (bags)	252
Potatoes (bags)	8,281
Bulbs (packages)	17
Plants (packages)	37
Seeds (packages)	5
Wine casks (empty)	3373

Rejected—69bush. bananas, 2bush apples.
Fumigated—6 packages plants.

Overseas

Federal Quarantine Act.

Five thousand nine hundred and eighty-two packages seeds, &c.

EXPORTS.

Federal Commerce Act

Six hundred and eighteen packages of dried fruit were exported to overseas markets. These were consigned as follows:—

London.	
Dried fruit	222
New Zealand.	
Dried fruit	120
South Africa.	
Dried fruit	202
Vancouver.	
Dried fruit	1
India and East.	
Dried fruit	73

THE AGRICULTURAL OUTLOOK.

REPORTS FOR THE MONTH OF JANUARY.

Booborowie.—Weather—The weather for January has been extremely cold and unseasonable, and up to the time of writing 143 points of rain have been registered. Crops—The lucerne crops on the Booborowie flat are looking remarkably well. Natural feed is plentiful. Stock—Livestock are all in good healthy condition. Miscellaneous—Farmers are still trying to complete harvest operations against great odds.

Eyre.—Weather—Exceptionally bad harvesting weather has been experienced, and farmers have only been able to harvest for half a day during some weeks. Crops—Harvesting has at last been completed, and some very satisfactory yields have been recorded. A number of the oat varieties on small areas have touched the 40bush. mark. Natural feed has dried off in most parts, but is sprouting on areas where thunderstorms have been heavy. Pests—Rabbits are becoming very numerous.

Kybybolite.—Weather—January has been a comparatively cool month, very few real hot days being experienced. Light rain fell on 12 days during the month, registering a total of 92 points, which is about double the average for the month. Winds have been principally from the west and south-west. Crops—All winter crops have been harvested, but mostly poor yields have been received. Wheat yields were poor; some oat crops yielded above the average. Early spring-sown barley and peas gave the best returns. Summer crops have made good growth during the month, especially maize, sunflowers, and turnips. The cool conditions have kept sorghum varieties back. Sudan grass has grown really well. Natural feed is in very fair quantity. English dandelion is becoming plentiful in some fields, and wireweed is thick in others. Mother Dutton is also fairly thick on some stubbles. Stinkwort is becoming a nuisance on some fields. Stock are in good health; spring lambs have grown really well. Miscellaneous—The underground irrigation water supply is very good this summer, the water level being 8in. higher than in previous yars.

Turretfield.—Weather—The early portion of the month was very wet for this season of the year, and altogether the month has been very cool. Rain fell on 11 days. Nearly all the crops are harvested; only a little hay remains uncarted. The yields, both of hay and grain, have been poor, and the returns for most farms much below the average. Natural Feed—There is little natural feed except wiregrass, which is thick in the stubbles. Stock is in fair to good condition. Pests—Birds are very troublesome in the vineyards and gardens. Minahs are very numerous. Miscellaneous—The growth of blanket weed and stinkwort is very strong, and will give much trouble to those putting in stubble land.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report of February 1st, 1924:—

BUTTER.—Unexpectedly this State continued to export a surplus of all grades of butters to interstate and overseas buyers, the length of the season being greatly assisted by the late rains and the wonderfully cool weather for this time of the year. Since our last report several fluctuations in values have taken place on account of the variation in the London market. Choicest factory and creamery fresh butter in bulk, 1s. 6½d.; prints, ½d. extra; first-grade butter in bulk, 1s. 5½d.; second-grade bulk, 1s. 3d.; third grade, 1s. 2½d.; best separators and dairies, 1s. 3½d. to 1s. 5½d.; fair quality, 1s. 2½d. to 1s. 3d.; store and collectors' of good condition, 1s. 1d. to 1s. 2½d.; heated lots, 1s. to 1s. 0½d. per lb.

EGGS.—Values throughout the month have remained practically stationary until the last two markets, when an advance of 2d. per dozen was recorded. At our auction extensive quantities were submitted, and were readily cleared either to local or interstate operators. Fresh hen, 1s.; duck, 1s. 1d. per dozen.

CHEESE.—During the month large supplies have been consigned from the South-Eastern factories weekly, and in sympathy with the lower quotations which the eastern States—especially Victoria—were offering at, values eased approximately 1½d. per lb. However, at the lower prices all consignments have been readily absorbed by local buyers, with limited sales to Western Australia, the range being 10½d. to 1s. 0½d. per lb. for large to loaf; semi-matured large, 1s. 1d.; semi-matured loaf, 1s. 2d.; fully matured, 1s. 3d. per lb. for large size.

HONEY.—Stocks throughout Australia appear to be light, as very strong inter-state inquiries have existed for the past few weeks, and the market has advanced ½d. per lb. since our last quotations. The new season's prime clear extracted in liquid condition is realising 5d. per lb.; best candied lots, 4½d. per lb.; lower grades down to 2½d., according to quality; beeswax for clear samples, 1s. 4d. per lb.

ALMONDS.—The quantities coming to hand have been about equal to the demand, with values slightly easier on account of the lower quotations at which importations can be made. Brandis, 8½d. to 9d.; mixed softshells, 7½d. to 8d.; hardshells, 4d. to 4½d.; kernels, 1s. 5½d. to 1s. 6d.; walnuts, 1s. per lb.

BACON.—Some difficulty has been experienced by merchants in securing their supplies of middles and rolls, and parcels have had to be brought from Victoria to fulfil sales, whilst with sides excellent demand has ruled at unaltered rates. Most curers have large supplies of hams left over from the Christmas trade, and as the demand is dull prices have receded 3½d. to 4d. per lb. Best factory cured sides, 1s. 3d.; middles, 1s. 5½d. to 1s. 6d.; rolls, 1s. 2d.; hams, 1s. 4d. to 1s. 4½d.; Hutton's "Pineapple" hams, 1s. 9d. Lard—Hutton's "Pineapple" brand in packets, 1s.; in bulk, 11d. per lb.

LIVE POULTRY.—As is usual in this month the supplies are short, the majority of consignors having forwarded their surplus birds for the Christmas sales, the result being that enhanced values were realised for all lots submitted, especially for prime-conditioned young roosters. The catalogues throughout the month consisted of fairly good class birds, and as buyers were in good attendance and excellent competition ruling, each pen sold at satisfactory prices to consignors. At present there is a shortage of turkeys, and high values are obtainable where birds are of good condition. We advise consignors to forward at earliest. Crates obtainable on application. The following rates ruled at the close of the month:—Prime roosters, 5s. to 7s. 6d. each; nice-conditioned cockerels, 3s. 6d. to 4s. 9d.; poor-condition cockerels, 2s. 9d. to 3s.; plump hens, 3s. 6d. to 5s.; medium hens, 2s. 3d. to 3s. 3d.; poor-condition hens, 1s. 6d. to 2s.; some pens of weedy sorts lower; geese, 5s. 3d. to 7s. 3d.; ducks, good condition, 4s. 6d. to 6s. 6d.; ducks, fair condition, 2s. 5d. to 4s.; turkeys, good to prime condition, 1s. 1d. to 1s. 8d. per lb. live weight; turkeys, fair condition, 11d. to 1s. 0½d. per lb. live weight; turkeys, fattening sorts, lower; pigeons, 6d. each.

POTATOES.—Victorian and Mount Gambier potatoes have been realising from 9s. to 10s. 6d. per cwt. on rail Mile End.

ONIONS.—Best-quality white onions, 9s. per cwt. on rail.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month of and to the end of January, 1924, also the average precipitation to the end of January, and the average annual rainfall.

Station.	For Jan., 1924.	Av'ge To end Jan., 1924.	Av'ge. Annual Rainfall
Far North and Upper North.			
Oodnadatta	0·70	0·69	4·94
Marree	0·98	0·45	6·07
Farina	0·81	0·55	6·66
Copley	0·60	0·65	8·39
Beltana	0·19	0·71	8·97
Blinman	0·22	1·02	12·53
Tarcoola	0·55	0·38	7·74
Hookina	0·20	0·68	13·46
Hawker	0·35	0·65	12·92
Wilson	0·40	0·69	12·58
Gordon	0·74	0·73	11·55
Quorn	0·56	0·73	14·21
Port Augusta	1·00	0·57	9·67
Port Augusta West	0·72	0·54	9·71
Bruce	0·68	0·54	10·77
Hammond	0·91	0·69	11·91
Wilmington	1·41	0·90	18·39
Willowie	1·14	0·55	12·57
Melrose	2·01	1·26	23·40
Booleroo Centre	1·21	0·83	15·65
Port Germein	1·41	0·68	12·89
Wirrabara	1·24	0·73	19·78
Appila	1·66	0·65	15·00
Cradock	0·40	0·65	11·52
Carrieton	0·81	0·84	12·90
Johnburg	0·57	0·63	10·91
Eurelia	0·80	0·82	13·54
Orroroo	0·69	1·04	13·73
Naokara	0·78	0·74	11·99
Black Rock	0·74	0·74	12·75
Ucolta	0·70	0·76	12·04
Peterborough	1·04	0·84	13·53
Yongala	1·18	0·67	14·58
Lower North-east.			
Yunta	0·48	0·70	8·88
Waukaringa	0·46	0·57	8·54
Mannahill	0·48	0·73	8·67
Cookburn	0·80	0·66	8·31
Broken Hill, N.S.W.	0·77	0·71	9·98
Lower North.			
Port Pirie	1·49	0·64	13·55
Port Broughton	1·31	0·62	14·29
Bute	1·08	0·63	15·78
Laura	1·27	0·73	18·26
Caltowie	1·71	0·69	17·20
Jamestown	1·65	0·67	17·89
Bundaleer W. Wks.	1·17	0·70	18·09
Gladstone	1·86	0·67	16·29
Crystal Brook	2·02	0·69	15·95
Georgetown	1·59	0·69	18·55
Narridy	1·24	0·59	16·37
Redhill	1·32	0·59	16·94

Station.	For Jan., 1924.	Av'ge To end Jan., 1924.	Av'ge. Annual Rainfall
Lower North—*continued.*			
Spalding	1·37	0·62	20·27
Gulnare	1·25	0·68	19·36
Yacka	1·27	0·52	15·48
Koolunga	1·32	0·62	15·89
Snowtown	1·08	0·62	16·07
Brinkworth	1·29	0·49	16·30
Blyth	2·24	0·69	17·03
Clare	1·99	0·86	24·68
Mintaro	1·63	0·59	23·57
Watervale	1·72	0·91	27·54
Auburn	1·60	1·00	24·35
Hoyleton	0·88	0·77	17·91
Balaklava	0·87	0·72	15·95
Port Wakefield	0·68	0·58	13·28
Terowie	0·97	0·72	13·82
Yarcowie	0·93	0·73	14·22
Hallett	1·27	0·72	16·49
Mount Bryan	1·59	0·52	16·81
Kooringa	1·65	0·76	18·09
Farrell's Flat	1·70	0·74	19·00
West of Murray Range.			
Manoora	1·42	0·58	18·92
Saddleworth	1·54	0·76	19·78
Marrabel	1·39	0·72	19·78
Riverton	1·30	0·79	20·79
Tarlee	1·37	0·79	17·93
Stockport	1·04	0·79	16·63
Hamley Bridge	1·05	0·82	16·59
Kapunda	1·37	0·85	19·89
Freeling	1·17	0·77	17·99
Greenock	1·57	0·79	21·68
Truro	1·76	0·73	20·20
Stockwell	1·51	0·73	20·32
Nuriootpa	1·37	0·80	21·00
Angaston	1·51	0·80	22·53
Tanunda	1·47	0·85	22·24
Lyndoch	1·48	0·77	22·93
Williamstown	1·09	0·91	27·48
Adelaide Plains.			
Mallala	1·01	0·75	16·72
Roseworthy	1·12	0·75	17·35
Gawler	1·19	0·73	19·11
Two Wells	0·65	0·71	15·88
Virginia	0·47	0·73	17·32
Smithfield	0·68	0·53	17·24
Salisbury	0·67	0·73	18·51
North Adelaide	0·83	0·82	22·37
Adelaide	0·71	0·73	21·08
Glenelg	0·11	0·65	18·45
Brighton	0·42	0·66	21·37
Mitcham	0·88	0·89	24·26
Glen Osmond	0·86	1·00	25·94
Magill	1·08	0·88	25·35

RAINFALL—*continued.*

Station.	For Jan., 1924.	Av'ge To end Jan., 1924.	Av'ge. Annual Rainfall
Mount Lofty Ranges.			
Teatree Gully.....	1·22	0 86	27·77
Stirling West	2·77	1·57	46·82
Uraidla	2·39	1 39	44·23
Clarendon	1·11	1·16	33·09
Morphett Vale ...	0·64	0·82	22·90
Noarlunga	0·34	0·64	20·41
Willunga	1·27	0·79	25·99
Aldinga	0·81	0·61	20·44
Myponga.....	1·02	0 70	29·80
Normanville	0·51	0·58	30·70
Yankalilla.....	0·43	0·60	23·31
Mount Pleasant ..	0·95	0·87	27·28
Birdwood	1·12	1·10	29·39
Gumeracha	1·48	1·10	33·36
Millbrook Reservoir	1·86	1·24	36·21
Tweedvale	1·23	1·06	35·65
Woodside	1 04	1·03	32·20
Ambleside.....	1·79	1·14	34·82
Nairne	1·38	0·98	28·44
Mount Barker	1·36	1·05	31·30
Echunga	1·64	1·10	33·06
Macclesfield	1·01	0·91	30·65
Meadows	1·71	1·09	36·19
Strathalbyn	1·03	0·70	19·36
Murray Flats and Valley.			
Meningie	0·71	0·65	18·74
Milang	0·57	0·65	15·45
Langhorne's Creek.	0·28	0·47	14·77
Wellington	0·52	0·75	14·80
Tailem Bend	0·49	0·48	14·68
Murray Bridge ...	0·53	0·59	13·94
Callington	0·94	0·70	15·49
Mannum	0·46	0·52	11·66
Palmer	0·31	0·48	15·46
Sedan	0·95	0·54	12·27
Swan Reach	0·65	0·36	11·06
Blanchetown	0·91	0·52	10·09
Eudunda.....	1·41	0·70	17·51
Sutherlands	1·27	0·34	11·20
Morgan	1·06	0·49	9·30
Waikerie	0·97	0·31	9·87
Overland Corner ..	0·86	0·50	11·03
Loxton	1·15	0·50	12·50
Renmark	0·82	0·49	11·06
Monash	0·89	0·53	—
West of Spencer's Gulf.			
Eucla.....	0·08	0·59	1 01
White Well.....	0·07	0·42	9·20
Fowler's Bay	0·19	0·39	12·14
Penong	0·20	0·36	12·53
Ceduna	0·30	0·26	10·25
Smoky Bay	0·35	0·29	10·98
Petina	0·28	0·36	12·95
Streaky Bay.....	0·27	0·44	18·07

Station.	For Jan., 1924.	Av'ge To end Jan., 1924.	Av'ge. Annual Rainfall
West of Spencer's Gulf—*continued.*			
Talia	0·34	0 31	15·32
Port Elliston	0·26	0·39	16·56
Cummins	0 06	0·51	18·56
Port Lincoln	0·31	0·59	19·66
Tumby	0·18	0·30	14·56
Carrow	0·26	0·40	14·42
Arno Bay	0·59	0·35	13·06
Cowell	0·50	0·45	11·63
Minnipa.....	1·08	1·08	15·51
Yorke Peninsula.			
Wallaroo	0·74	0·55	14·15
Kadina	0·98	0·51	16·02
Moonta	0·63	0·52	15·35
Green's Plains	0·71	0·53	15·86
Maitland	0·87	0·62	20·17
Ardrossan	0·32	0·52	14·18
Port Victoria	0·42	0·48	15·50
Curramulka	0·27	0·61	18·20
Minlaton	0·32	0·53	17·90
Brentwood	0·16	0·41	15·83
Stansbury	—	0·62	17·01
Warooka	0·15	0·46	17·80
Yorketown	0·27	0·49	17·24
Edithburgh	0·22	0·53	16·58
South and South-East.			
Cape Borda.....	0·48	0·62	25·08
Kingscote	0·34	0·47	19·04
Penneshaw	0·43	0·52	19·47
Victor Harbor	0·58	0·73	21·49
Port Elliot	0·73	0·67	20·12
Goolwa	0·44	0·66	17·89
Pinnaroo	0·71	0·41	15·50
Parilla	0·16	0·45	14·51
Lameroo	0·50	0·55	16·32
Parrakie	0·75	0·38	14·58
Geranium	0·74	0·40	16·62
Peake	0·68	0·55	16·73
Cooke's Plains ...	0·90	0·54	15·14
Coomandook	0·77	0·51	17·49
Coonalpyn	0·63	0·68	17·40
Tintinara	0·69	0·50	18·70
Keith.....	0·51	0·36	18·22
Bordertown	0·62	0·75	19·39
Wolseley	0·61	0·61	18·12
Frances	0·98	0·69	19·73
Naracoorte	0·81	0·80	22·56
Penola	1·14	1·02	26·26
Lucindale	0·93	0·71	23·00
Kingston.....	1·16	0·73	24·51
Robe	1·10	0·79	24·69
Beachport.....	0 68	0·89	27·20
Millicent	1·42	0·94	29·39
Kalangadoo	1·78	0·93	32·47
Mount Gambier ..	1·49	1·36	31·29

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings	
		Feb.	Mar.
Alawoona	*	—	—
Aldinga	*	—	—
Allandale East	722	—	—
Amyton	*	18	24
Angaston	*	—	—
Appila-Yarrowie	*	—	—
Arthurton	*	—	—
Ashbourne	*	9	8
Balaklava	716	15	14
Balhannah	*	18	17
Barmera	*	—	—
Beetaloo Valley	*	16	15
Belalie North	714	20	19
Berri	704	—	—
Bethel	*	—	—
Big Swamp	722	22	21
Blackheath	705	19	18
Black Springs	*	18	17
Blackwood	*	—	—
Block E	*	2	1
Blyth	*	15	21
Booleroo Centre	*	—	—
Borrika	*	21	20
Brentwood	*	16	15
Brinkley	*	—	—
Bundaleer Springs	*	19	18
Bute	707	—	—
Butler	*	—	—
Calca	*	—	—
Cadell	*	—	—
Canowie Belt	*	20	19
Carrow	722	19	18
Cherry Gardens	*	—	—
Clanfield	*	—	—
Clare	*	18	17
Clarendon	*	20	19
Claypan Bore	*	20	19
Cleve	*	—	—
Collie	*	29	28
Colton	714	20	19
Coomandook	707, 716	22	21
Coomalpyn	*	—	—
Cradock	*	16	15
Crystal Brook	*	—	—
Cungena	*	22	21
Currency Creek	718, 722	21	20
Cygnet River	*	—	—
Darke's Peak	*	—	—
Denial Bay	*	23	29
Edillilie	*	26	25
Elbow Hill	*	—	—
Eurelia	*	—	—
Farrell's Flat	*	23	29
Frances	*	18	24
Gawler River	*	16	15
Georgetown	*	23	29
Geranium	*	—	—
Gladstone	*	15	21
Glencoe West	*	—	—
Glossop	‡	27	26
Goode	*	20	19
Green Patch	*	18	17
Gumeracha	*	18	24
Halidon	*	—	—
Hartley	720	20	19
Hawker	*	19	18
Hilltown	*	—	—
Hookina	702	21	20
Inman Valley	*	—	—
Ironbank	*	16	15
Kadina	*	—	—
Kalangadoo (Women's)	*	9	8
Kalangadoo	723	9	8
Kangarilla	720, 722	22	21
Kanmantoo	*	16	15
Keith	*	—	—
Ki Ki	*	—	—
Kilkerran	*	21	20
Kimba	*	—	—
Kingston-on-Murray	*	—	—
Kongorong	‡	21	20
Koonibba	*	15	21
Koppio	*	18	17
Kringin	716	—	—
Kybybolite	*	21	20
Lake Wangary	*	16	15
Lameroo	*	22	21
Laura	*	23	22
Lenswood and Forest Range	*	—	—
Light's Pass	*	—	—
Lipson	*	—	—
Lone Gum and Monash	708	20	19
Lone Pine	*	—	—
Longwood	722	—	—
Loxton	*	—	—
Lucindale	*	—	—
Lyndoch	*	21	20
McLachlan	*	—	—
McLaren Flat	‡	—	—
MacGillivray	*	19	18
Maitland	*	21	20
Mallala	*	18	17
Maltee	*	15	21
Mangalo	*	—	—
Mannanarie	704	21	20
Marama	*	—	—
Meadows	*	20	19
Meningie	*	—	—
Mflang	*	9	8
Millicent	*	2	1
Miltalie	*	16	15
Mindarie	*	4	3
Minlaton	*	15	21

INDEX TO AGRICULTURAL BUREAU REPORTS—*continued.*

Branch.	Report on Page	Dates of Meetings. Feb.	Mar.
Minnipa	*	20	19
Monarto South	*	—	—
Moonta	*	15	21
Moorak	*	21	20
Moorlands	*	—	—
Moorook	*	18	24
Morchard	*	16	15
Morphett Vale	*	21	20
Mount Barker	*	20	19
Mount Bryan	*	—	—
Mount Byran East	*	—	—
Mount Compass	*	—	—
Mount Gambier	724	9	8
Mount Hope	*	16	15
Mount Pleasant	721	—	—
Mount Remarkable	*	—	—
Mount Schank	*	19	18
Mundalla	*	20	19
Murray Bridge	*	—	—
Mypolonga	*	20	19
Myponga	*	—	—
Myrla	*	16	15
Nantawarra	*	21	20
Naracoorte	724	9	8
Narridy	*	23	22
Narrung	*	23	22
Neeta	*	—	—
Nelshaby	*	16	15
Netherton	*	15	21
North Booborowie	*	R	11
North Bundaleer	*	—	—
Northfield	*	—	—
Nunkeri and Yurgo	*	3	2
O'Loughlin	*	20	19
Orroroo	702	—	—
Owen	*	15	21
Parilla	*	15	21
Parilla Well	*	18	24
Parrakie	*	—	—
Paruna	*	—	—
Paskeville	*	15	21
Pata	*	—	—
Penola	*	2	1
Petina	*	23	22
Pinnaroo	*	R	15
Pompoota	*	13	12
Poochera	*	2	1
Port Broughton	*	15	21
Port Elliot	*	20	19
Port Germein	*	23	22
Pygery	*	16	15
Ramco	710	18	17
Rapid Bay	‡	2	1
Redhill	*	—	—
Rendelsham	*	20	19
Renmark	710	21	20
Riverton	*	—	—
Riverton (Women's)	*	—	—
Roberts and Verran	705	21	20
Rockwood	‡	18	24
Rosedale	*	—	—
Rosy Pine	*	—	—
Saddleworth	*	—	—
Saddleworth (Women's)	*	12	11
Salisbury	*	5	4
Salt Creek	*	—	—
Sandalwood	*	—	—
Shoal Bay	*	19	18
Smoky Bay	*	—	15
Spalding	*	—	—
Stockport	*	22	21
Streaky Bay	*	—	—
Strathalbyn	*	19	18
Talia	*	11	10
Tantanoola	‡	16	15
Taplan	*	19	18
Tarcowie	*	19	18
Tarlee	*	R	—
Tatiara	*	16	15
Tweedvale	722	21	20
Two Wells	*	—	—
Uraidla & Summertown	*	4	3
Veitch	*	—	—
Virginia	*	—	—
Waikerie	*	—	—
Wall	*	—	—
Wanbi	*	—	—
Warcowie	*	—	—
Watervale	*	—	—
Weavers	‡	18	17
Wepowie	*	19	18
Whyte-Yarcowie	702	—	—
Wilkawatt	*	16	15
Williamstown (Women's)	*	6	5
Williamstown	*	15	21
Willowie	*	20	19
Wilmington	*	20	19
Windsor	*	—	—
Winkie	*	—	—
Wirrabara	704	—	—
Wirrega	*	—	—
Wirrilla	*	16	15
Wirrulla	*	—	—
Wokowa	*	—	—
Wookata	*	—	—
Wudinna	*	—	—
Wynarka	*	—	—
Yacka	*	19	18
Yadnarie	706	19	18
Yallunda Flat	*	—	—
Yaninee	*	—	—
Yeelanna	*	16	15
Yongala Vale	*	—	—
Yorketown	*	—	—
Younghusband	*	21	20

* No report received during the month of January. ‡ Held over until next month. R. Recess.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

HOOKINA (Average annual rainfall, 12in.).

December 20th.—Present: 11 members and five visitors.

PLOUGH *versus* CULTIVATOR FOR FALLOWING.—A member read a paper from the *Journal of Agriculture* dealing with this subject, and in the discussion that followed Mr. P. Kelly said he had found the disc cultivator the best, and on sandy ground preferred that implement to the plough for fallowing. Mr. J. O'Connor favored the plough for fallowing, but used the cultivator for working the land the second time. Members generally were of the same opinion as Mr. O'Connor. The cultivator took a wider strip, but did not do such good work as the plough, and caused more lost time after rain, &c.

ORROROO, December 22nd.—A paper dealing with the subject, "Power and Transmission of Power," was read by Mr. G. Graham.

Advice has been received from the Hon. Secretary of the Orroroo Branch (Mr. H. G. Matthews) that it is proposed to hold an Agricultural Show under the auspices of the local Branch of the Agricultural Bureau early in March, 1924.—[Editor.]

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

WHYTE-YARCOWIE (Average annual rainfall, 13.91in.).

November 19th.—Present: 10 members.

CONSERVATION OF FODDER.—The following paper was contributed by Mr. P. J. McEntee:—"The subject of fodder conservation in a State subject to periodical droughts is one of the very greatest importance to farmers. Most of the members of this Branch have experienced the difficulties of procuring the fodder necessary to keep the livestock on the farm alive during bad seasons, to say nothing of the abnormal prices they have had to pay at such times. The aftermath of such visitations is usually a greatly depleted bank balance or perhaps even an overdraft. I have noticed, in different parts of the State, that in years of drought some farmers have had sufficient fodder for their own needs and have also supplied their less fortunate neighbors. These men may have been lucky; but it is more than probable that they looked ahead. The purpose of this paper is to bring home to members, if possible, the necessity for making provision for lean years, for it seems that each succeeding drought finds many unprepared. Hay is the most important method of conserving fodder on the average farm, and I propose to deal with that first. The area intended for the hay crop should be selected at seeding-time, and should be sown with a wheat of an early variety at the rate of not less than 1bush. to the acre. In a district where 80lbs. of superphosphate is the average dressing, at least 1cwt. (or more) should be used on the hay area. This will ensure a heavier growth. The hay-ground should be rolled—not necessarily at

seeding time—so that a comparatively level surface may be secured for the binder. It also makes for cleanliness—an important factor in the feeding of animals. Further, the binder may be set lower, ensuring a maximum cut. The hay should be cut when just on the turn to ripening. Careful stooking repays the extra hours spent on this work, for the farmer often has to interrupt the haymaking to start reaping, and a well-built stook will run the rain off the sheaves. On the other hand, carelessly stooked hay on which rain has fallen may very well become the breeding-ground of fungi that may seriously affect the health of the horses, or even prove fatal to them. For the bed of the stack, either timber or straw may be used. Care should be taken in building the stack, and all stacks should be thatched properly, beginning at the eaves and working up, or failing that, they should be covered with straw. On every farm should be constructed a mouseproof hay-stand, say 40ft. x 18ft. This would take, say, 20 sheets of iron, 120ft. oregon or hardwood, and about 20 jarrah uprights. Now comes the problem of providing a double supply of hay in any one year. It could be overcome by making special provision at seeding time. The question arises, too, of the time this particular hay should remain in the stack; but, however long it remains there, no farmer will be anxious for a drought in order to use his reserve supplies of fodder. Straw, too, may be stacked yearly, and this will be found valuable, especially in bad seasons. When strippers were in general use, cocky chaff was invariably conserved, and I have known it to comprise the morning, noon, and evening meals of the horses during seeding and fallowing times. It was damped and seasoned with bran and pollard, or crushed or boiled wheat. There are various carriers attached to harvesters, but as to their utility I am not in a position to speak. However, it seems that if cocky chaff could be conserved, it would prove a boon in time of need. Another fodder, lucerne, may be stored very easily. If stacked like ordinary loose hay it keeps very well. One other fodder may be mentioned—peas. Those who keep sheep should grow peas. They are valuable fattening food, materially increase the carrying capacity of the land, and may be cut and stacked for use when feed is scarce."

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In the discussion that followed, Mr. G. McGregor advocated the sowing of from 1½bush. to 1¾bush. of seed to the acre for the hay crop, because the harvester was responsible for a good deal of cracked and damaged grain. Mr. A. Green considered that hay was the best means of conserving fodder. He also thought that a stand built of short posts covered with pieces of iron, and a floor of strong timber, would successfully combat the mice. Mr. S. Hunt always made a practice of keeping at least 12 months' supply of hay on hand. Mr. Napper thought the crop should be harrowed after it was up, instead of rolled. Mr. Robinson preferred hay cut a little on the green side for stacking, in order to reduce to a minimum the havoc caused by mice. Mr. K. Keatley suggested erecting a stack of straw and sprinkling it with molasses. Mr. McCallum favored the suggestion of the previous speaker, and said a stack of straw would be most useful in keeping young and spare stock in good condition through the winter.

WIRRABARA (Average annual rainfall, 18.91in.).

December 22nd.—Present: 11 members and visitors.

LUCERNE ON THE FARM.—Mr. A. R. Woodland, who contributed a paper dealing with his subject, expressed the opinion that lucerne was one of the best fodder plants, and it was surprising how few fams had a plot of land devoted to its cultivation. Lucerne was rather particular in its soil requirements, yet the majority of farms had land on which the crop could be grown successfully if given the proper treatment. The land on which it was intended to plant the lucerne should be ploughed during the winter and be kept free from weeds by subsequent cultivation until the following April, when the seed should be sown at as shallow a depth as possible. If the seed drill was used for that purpose, the hoes should be allowed to run on the surface of the soil, and the seed would germinate immediately after the first rain. At that time weeds would also make an appearance, but they should not be touched until the spring time. Early in the spring the whole plot should be mowed as closely to the ground as possible. The lucerne would then be able to make some headway, and the second year it should produce a good crop of excellent feed. Subsequent cultivation consisted in scarifying the land early every winter with a narrow tyne cultivator, and drilling in from 2cwts. to 3cwts. of super to the acre. After the crop had been cut it should be allowed to remain on the land until thoroughly dry, when it should be raked and stacked without any loss of time. The stack should be covered with galvanized iron, because the small outlay required for the erection of the shed would be saved many times over in the elimination of waste due to the rain getting in to the stack.

MANNANARIE, November 22nd.—Mr. L. F. Gerke read a valuable paper, "Kitchen Gardening," and an interesting discussion ensued. Several questions of local importance were also brought before the meeting.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BETHEL.

November 6th.—Present: 10 members and visitors.

Mr. J. B. Harris (Orchard Instructor and Inspector for the district) attended the meeting and delivered an address. "Laying Out the Farm Garden." Mr. F. C. Richards, of the Department of Agriculture, was also present and spoke on the work of the Agricultural Bureau.

PROFITABLE FARMING.—At a further meeting held on November 27th, Mr. F. Schmidt read a paper dealing with this subject, in which he said that in many cases a small farmer held the opinion that farming was not a profitable undertaking unless the whole of the farm was under crop or fallow. That method of managing a small holding was evidently not the most profitable, because past experience had proved that the land would not stand continual wheat cropping. The majority of farmers in that district, and in many other districts also, frequently had to face the fact that their average wheat crop yield was about 10bush. to 15bush. to the acre, whereas it should be from 15bush. to 25bush. The question then arose, "Is there no remedy for this continued low yield?" Mr. Schmidt mentioned that he had given a good deal of attention to that

question during recent years, and he had come to the conclusion that the land required a rest and a change of crop to keep it in good heart and condition for wheat-growing. A change to barley, oats, and peas would improve the land The small land holder had to consider how he was to give his land a spell and a change of crop. It was advisable to subdivide a small farm into four or five equal portions, which would make it possible for the farmer to rest the land, and also give it the needed change of crop. The practice of sowing barley, oats, or peas on stubble land had proved very satisfactory. To fallow a paddock, then crop it with wheat, followed by barley, and then give the land a rest, took a period of four years, and if the farm was divided into five paddocks it would throw each paddock out for two years' grazing, which would be a profitable proposition. It was also advisable after a paddock had had a rest of, say, one or two years to fallow the land and work it thoroughly until November. In most cases fallow land did not receive sufficient working up till that time, and it did more harm than good to be stirring the land during the summer months. The only work which it was advisable to do during the summer was to use the harrows or the roller after a shower of rain. A fair quantity of seed and super should always be applied; seed from 1½bush. to 2bush. per acre and super from 1cwt. to 2cwts. Heed should be given to the time of seeding. Many people were of the opinion that putting in stubble ground did not pay, but in a large number of cases the stubble ground was sown at the most unsuitable time. In average years the best results were generally obtained from a crop sown after the first rain either at the end of April or the beginning of May. The first sown crops generally proved to be the best either on stubble or fallow ground. An interesting discussion followed.

BLACK SPRINGS, November 23rd.—The November meeting took the form of a "Question Box," when a number of subjects of local interest were brought before members for discussion.

WESTERN DISTRICT.

ROBERTS AND VERRAN.

November 22nd.—Present: 10 members and three visitors.

ADVANTAGES OF THE AGRICULTURAL BUREAU.—The following paper was read by Mr. M. Masters:—"The Agricultural Bureau has been established for 37 years, and has proved beneficial to all interested in agriculture. It stands for the promotion of agriculture. Every settler on the land should be a member of the Bureau. Every producer is liable to success or failure, and should want to know the reason of either, if he is to help develop the country. Bureau meetings should be held regularly. Papers should be read and discussed, and every member should take part in the discussion. Every member of the Bureau should conduct experiments and make the results known to his fellow-members. Government experimental farms are established to help the producers, and it is through the Bureau that they are able to obtain the results of the work on those farms. Every member is entitled to a copy of the *Journal of Agriculture*, thus enabling him to obtain expert knowledge. Expert officers of the Department of Agriculture visit Branches of the Bureau and deliver addresses and answer questions, which are very helpful to the man on the land. A debate on some subject of agricultural interest makes an interesting meeting and helps members to become good public speakers. The Bureau also enables the man on the land to get into closer touch with the Department of Agriculture." In the discussion that followed, Mr. A. T. Cowley thought the suggestion that members should conduct experiments and make the results known a good one. The fact that members were in touch with the departmental officers was also a great advantage to those engaged in agricultural pursuits. Mr. B. Evans suggested an occasional homestead meeting to maintain interest in the work of the Branch.

FARM TRACTORS.—Mr. D. Jonas read the following paper:—"The agricultural tractor on the farm has advantages over horses in working the land, because the work can be done more quickly and with less expense to the farmer. With the tractor there is not the loss of time that there is in feeding and preparing horses for the day's work and in changing teams or stopping work for one and a half

hours at dinner time to give the horses a feed. The land that would have to be put in for feed can be used for some other suitable crop, with less haycarting, stacking, and chaffcutting, and there is less water to conserve or cart, which means time to the farmer. I do not say horses could be entirely dispensed with on the farm, because one team could be used for carting and assisting in drilling and harrowing. The tractor could take the place of the stationary engine for chaffcutting, wood sawing, and pumping water." The following schedule of costs of working a tractor was then quoted by Mr. Jonas:—"Ploughing 100 acres, the tractor used 112½galls. kerosene, which cost £8 18s. 1d.; cost per acre, 1s. 9d. Drilling 100 acres, 52½galls. kerosene, £4 3s. 1d.; cost per acre, 10d. Harrowing 100 acres, 28galls. kerosene, £2 4s. 6d.; cost per acre, 5½d. Total cost, £15 5s. 8d. In a few years more tractors will be used for farming, because there is no doubt that the tractor has proved that it can take the place of horses for hauling and all general purposes." In discussing the paper, Mr. G. Smith considered the tractor to be much better than horses, but did not think that horses should be dispensed with altogether. On an ordinary-sized farm about eight or 10 horses could be kept for the lighter work, such as drilling, stripping, &c., and the tractor used for ploughing and stationary work. Mr. H. Smith thought if a tractor could be worked as cheaply as stated by Mr. Jonas it would mean a great saving when compared with horses. A few horses should be kept, however. A tractor could be used for chaffcutting, winnowing, &c., and would be more satisfactory for that work than an ordinary engine. Mr. W. Whittaker said that a six or eight horsepower stationary engine would cost about the same as a tractor with 22 horsepower at the pulley. However, he did not think the time was ripe for doing all the work on the farm with a tractor. He pointed out that a small tractor would cost about the same as 10 good draught horses, and a couple of foals could be bred every year to keep up the strength of the team, and in 10 years that would mean 20 horses, whereas the tractor would probably be worn out by that time. Mr. H. Lewis considered a tractor would be very useful on a farm, but he thought a few horses should be kept. Much time would be saved when the horses were feeding. A tractor could be worked longer hours than horses if necessary. Mr. C. Simmons thought that in time to come the tractor would take the place of horses. The cost or working was less and there was a great saving in time. Mr. C. Masters considered a tractor a very handy implement for the farmer. He preferred a small tractor, because it could be used for a greater variety of jobs than a large one. Mr. H. Simmons said a tractor was a very useful implement for a man commencing work on a scrub block, because it did away with water-carting, &c. It was also handy for stationary work. Mr. A. T. Cowley said it had been stated that tractors could not be worked profitably, because both the tractors and fuel had to be imported, but he held the opinion that tractors would do more work than horses. If he were starting again he would use a tractor and have his implements sized accordingly. An eight horsepower tractor was a handy size. It would pay to standardise the power and size of implements, &c. He mentioned that it was often stated in favor of tractors that time was saved through not having a team to feed at midday, but he found an opportunity while the horses were feeding to do small repairs to the implement which was in use. Mr. G. Smith asked how tractors compared with horses for road haulage. Mr. C. Simmons stated that with rubber grips the tractors compared favorably with horses. Mr. B. Evans thought a tractor would be very useful for auxiliary power, but he would not care to rely on it entirely. It would be handy for speeding up the work at seeding and fallowing time. Mr. M. Masters said although the working costs of the tractor and horses were about equal, one great advantage of the horses was that they could be bred from, and thus keep up the strength of the team, whereas with the tractor it meant paying for another one in about 10 years.

YADNARIE (Average annual rainfall, 14.09in.).

October 23rd.—Present: 13 members and visitors.

The report of the delegates to the Annual Congress was received and discussed A report of the tractor trial that had recently been held at Lipson was given by Mr. J. J. Deer.

QUESTION BOX.—The meeting held on November 20th took the form of a Question Box. In discussing the question, "What capital do members consider necessary to start farming in new mallee country?" Mr. G. W. Jericho said the

question was one which depended on the experience that a man had to his credit. Where one man could start with £100 another would not be able to start with £1,000. Mr. W. L. Brown advocated starting on the share system. In his opinion a man required from £300 to £400. Another member said £500 was the least with which a man could start farming, but he would have to be very careful and understand the work to make a success of the venture. "Will oats grow as prolifically after a heavy crop of wheat as after a light crop of wheat?" Messrs. Brown and Spriggs thought oats would do better after a heavy crop of wheat because the stubble fire tended to sweeten the soil.

BUTLER, October 22nd.—Visitors and members of the Butler Branch of the Agricultural Bureau, to the number of 60, met at the residence of Mr. C. F. Jericho on October 22nd and inspected the experimental plots being conducted by Mr. Jericho. Mr. R. Hill (Manager of the Minnipa Experimental Farm) was present and delivered an address, "Experimental Work on Eyre Peninsula."

EASTERN DISTRICT.

COONALYPN (Average annual rainfall, 17.49in.).

November 23rd.—Present: 11 members and five visitors.

LARGE *versus* SMALL HOLDINGS.—Mr. C. T. George spoke on the advantages to be gained by cropping comparatively large areas as against concentrating on a small scale. He instanced the cases of men cropping 150, 250, and 500 acres respectively, giving an estimated expenditure for plant, &c., and the ultimate yield



showing in favor of the man cropping the largest area. He thought that larger implements might be used, and more land brought under cultivation, the bushes being easily kept in check with a "Sundercut" cultivator. He thought it more profitable to aim at getting a medium average over a large area than to work for a very high average over a small cropping. Several members disagreed with the idea, considering it too risky. Other items of local practice were also discussed.

LONE GUM AND MONASH.

November 21st.

THE DRYING OF FRUIT.—The following paper was read by Mr. L. A. Chapple:—"In preparing dried fruit for market the blocker or orchardist should aim at producing an article of the best quality, because this only will enable us to hold our own in the oversea markets. Local markets have long since been over-supplied, and the days are past when haphazard methods of fruit-drying will be accepted. With the keen competition that exists, the public demands a high-grade fruit, and unless the grower produces what the public require, fruitgrowing will not be a profitable undertaking. It is well to remember that the production of dried fruit does not commence on the drying green, but much before this stage is reached. In the first place, select land that will suit the particular class of fruit you intend to grow. See that it is well drained, because it has been proved in all the irrigation settlements that drainage is one of the first essentials in the production of fresh or dried fruit. Next, see that the best varieties are planted for drying. Obtain trees from a reliable nurseryman, where you can be reasonably certain of securing trees worked on good stocks, true to name. Pay attention to spraying, so that the fruit is not damaged by insect and fungus pests. Prune, water, and manure intelligently, and then when the fruit comes to maturity, exercise care in harvesting. Much good fruit is spoilt, either by allowing it to become over-ripe, or by picking it in too green a condition. Fruit is often allowed to fall to the ground and become sunburnt, bruised, or dirty, and then gathered and placed on the drying-tray with sound, well-ripened fruit picked off the trees. Such fruit can only produce a second grade article, and it is a serious mistake on the part of the grower to think that it can be placed with a first class article and sold for top prices. The fruit will be sold according to sample, and the buyer will purchase according to the lowest grade in that sample. Fruit is no longer graded according to size alone; color and cleanliness have become important factors in determining the top-grade article. This is as it should be, and the grower should exercise special care in sorting out inferior and windfall fruit before it is placed on trays. Such fruit, if it is dried, should be kept in separate sweat-boxes and packed separately. The apricot is one of the best known dried fruits, and requires harvesting immediately it ripens, otherwise it falls to the ground, and owing to its soft condition, squashes in the sand and is spoilt. The trees should be inspected every other day, and the fruit picked when fully ripe though still firm. The most popular way of dealing with apricots is to split them, though they may be dried whole. I do not, however, recommend the latter method, because in the past much inferior fruit has been placed on the market, either very small fruit which has been considered too costly to split, or under-sulphured fruit which has a very unattractive appearance. These two factors are largely to blame for the public disfavor of the whole-dried apricot. The split apricot is placed on trays, split side up. Care should be taken to make a clean cut, because jagged edges tend to spoil the appearance of the fruit. The trays of fruit are then placed in the sulphur house, and sulphured until the cups are full of juice. The amount of time to be allotted for this process is largely controlled by the weather. Fruit will sulphur more quickly in hot weather than in cold weather; but, as a general rule, eight hours will be sufficient to treat the fruit. The amount of sulphur to be used is again determined by the size and condition of the sulphur house. The size of the surface of the receptacle in which the sulphur is placed also has much to do with the amount of sulphur to be used. As a guide, I would suggest about 3lbs. of sulphur in a house containing up to 100 trays. The sulphur can be placed in tins and strips of hessian put down through it to act as wicks. When this is done the fire is not so likely to smother. The sulphur is easily set alight with a match or a small live coal. All the air should not be excluded from the sulphur house. When the fruit is taken from the sulphur house it should be spread on the drying green

until it is about half dry. Then it can be stacked and drying completed in the stack. Great care should be taken not to put the fruit out in a fresh condition if the weather is windy. On such days all trays should be stacked with a couple of empty trays at the bottom to prevent the fruit being spoilt by dust and sand. If the trays are placed on the bare ground, it will be found that rubbish and sand will stick to the bottom of the trays by means of the juice which has run out of the fruit. To overcome this difficulty and where suitable drying greens have not been provided, strips of wood (bamboos answer the purpose admirably) should be placed in double rows and the trays rested on them. The fruit should be taken off the trays before it becomes too dry, and placed in sweat-boxes to allow the moisture to return to an even temperature. If the fruit is to be dried whole, it should first be placed in a dip tin, then dipped in a boiling lye made by adding 1lb. of caustic soda to 20galls. of water, and immediately after the bucket of fruit should be plunged into cold water. This is to prevent the skin breaking and the fruit becoming squashy. The lye cracks the skin sufficiently to allow of quick drying, whilst the cold water sets the skin sufficiently to prevent rubbing off through scalding. The fruit is then placed on the flat on trays, sulphured, and then spread in the sun to dry in the usual way. It is most important to place the fruit on the side, otherwise a nice flat appearance cannot be obtained, and the fruit will be irregular in sample. The peach and nectarine are dealt with in a similar manner to the apricot. Peaches are split and require more sulphur than apricots. They should be sulphured until the cups are full of juice or until the fruit has a cooked appearance. If under-sulphured, a dark color will result. Nectarines are treated in a like manner, only that it is possible to whole-dry the clingstone varieties in the same manner as whole-dried apricots. Pears are picked as soon as they are fully matured, though still quite green. The time to gather can be determined by giving the fruit an upward lift. If the fruit is ripe, the stem breaks away freely. The fruit should be handled carefully so that it does not become bruised, and be placed in boxes and packed away from the light. It will soon ripen, and when soft should be cut in two from end to end, placed on trays with the cut side facing upwards, and sulphured. This fruit requires a lot of sulphur, and after treatment, unless it is quite soft and presenting a cooked appearance, it should be sulphured again. When the fruit is thoroughly sulphured, it should be placed in the sun for a couple of days, then stacked, and the drying completed in the stack. *Prunes.*—This fruit should be very ripe when gathered. It should then be placed in dipping-tins and immersed in boiling lye, made by placing 1lb. of caustic soda into 20galls. of water. It then should be dipped into cold water to harden the skin, and spread on trays to dry. If the weather is hot, I recommend shade drying. The fruit when taken off the trays should be allowed to sweat for about a fortnight, after which it should be put through a glossing dip made in the following manner:—To 20galls. of water add 1lb. of glycerine, ¼lb. of salt, and ¼lb. of wattle gum. Boil the mixture and immerse the fruit in dipping-tins for a few seconds, after which it should be spread on trays to dry. It will dry in a few hours, and can then be graded and packed. When drying light-colored plums—such as Jefferson or Golden Drop—the fruit should be sulphured after the caustic lye dip, and then finished off in the sun in the same manner as apricots. *The Currant.*—Here again care should be taken by the picker not to mix poor or unripe fruit with fruit of a good quality when placing it on the racks. Inferior fruit so mixed will lower the grade and result in a loss to the grower. The fruit when picked should be thoroughly ripe and immediately spread on the rack. Currants should be shade-dried on a completely enclosed rack. If the rack has an iron roof, which is no doubt the best, side-curtains can be erected, thus completely excluding the sun's rays, which tend to make the fruit red in color. When the fruit is nearly dry it should be rubbed off on to hessians, the prongs of a pitchfork being the best implement for this work. The fruit then should be spread out in the sun to complete the drying process. It should be sweated for some time to allow for the evening-up of the fruit. Care should always be taken not to box up fruit whilst it is still hot from the rays of the sun. Currants are sometimes dried on trays, and in this case they should always be stacked when the weather is hot otherwise they become sunburnt and the fruit becomes red in color. The Lexia, Gordo, or White Malaga, when picked, is dipped in boiling lye, made by adding 1lb. of caustic soda to 18galls. or 25galls. of water. It is then spread on the racks to dry, or if trays are used, spread directly in the sun. If the fruit is spread on trays, it should be

turned about the third day. This is done by placing an empty tray on top of the one filled with fruit, then two men, one at each end of the tray, turn it over, leaving the fruit respread on the new tray. If the fruit is dried on racks it should be rubbed off on to hessian as soon as sufficiently dry, finished in the sun, and then sweated for some time to allow for the evening-up of the moisture in the fruit. The Sultana.—There is more difference of opinion as to the method to follow in drying the sultana, perhaps, than in preparing any other fruit. The fruit should be thoroughly ripe before being picked. It then should be dipped in boiling lye, made by adding 1lb. of caustic soda to 25galls. or 30galls of water, and then spread on the rack or on trays to dry. The same process as described for the Gordo Lexia is carried out to complete the work. While I recommend a lye of 1 in 25 or 1 in 30, it is necessary for the grower to make his own tests as to strength, because fruit differs according to soil, and no doubt there are different qualities in caustic soda. When the dip is made the correct strength, very small cracks should appear in the skin of the berries. A bunch immersed before dipping starts, and exposed to the air for a few minutes, will show very tiny cracks around the stem end of the berry. The dip can then be considered the right strength. It should be the aim of the grower to obtain dried fruit showing a nice golden color."

RAMCO.

November 19th.—Present: 17 members and four visitors.

During the afternoon an inspection was made of the orchards of Messrs. H. Hunter and F. Lewis. In the evening the usual meeting was held. Mr. C. Boehm tabled a cincturing knife made from a watch spring. In connection with the pruning competitions the chairman (Mr. C. Boehm) presented a medal to Mr. W. Perry for gaining top place in Gordo section with 93 points, and certificates to Messrs. W., G., and A. Perry. The meeting then discussed several points of interest that had arisen during the homestead meeting.

RENMARK (Average annual rainfall, 10.93in.).

November 15th.—Present: 25 members and six visitors.

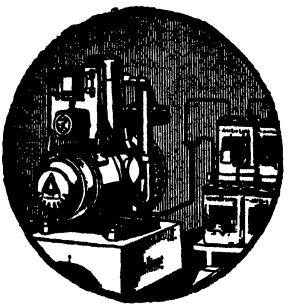
THE SCIENCE OF IRRIGATION.—The following paper was head by Major Tolley, D.S.O. (Chief Engineer of the Renmark Irrigation Trust):—"It is impossible to treat this important subject comprehensively in one evening, but I wish to emphasise a few points and will welcome criticism and do my best to reply to questions. There is a tremendous agitation throughout the fruitgrowing districts at present towards lessening the costs of packing and selling the produce. Is it not equally important to cheapen production by increasing the yields and quality of fruit to the acre? The average yield of dried sultanas along the Murray does not exceed half a ton per acre, yet every settler who is giving proper attention to irrigation is averaging over a ton. Thirty hundredweight is not an over-ambitious average to aim at. My object is to describe the action of water artificially applied to the soil, point out the dangers and limitations, and describe the ideal at which all fruitgrowers should aim. Water occurs in soils as hydroscopic, capillary, and gravity water. You have noted the power salt has to absorb moisture from the atmosphere. All soils have this hygroscopic power, soils rich in humus absorbing much more than poor soils, but even the richest soils cannot absorb sufficient moisture from the atmosphere to support plant life. Capillary water exists as a thickened film of water around each soil particle and partially fills the spaces. This water cannot be removed by drainage and through the peculiar attraction that soil and water have for each other, the water moves in every direction. Capillary water rises higher in fine textured soils than in coarse soils, but it moves much more rapidly in the latter. In a comprehensive series of tests it was found that capillary water rose 17in. in six days in light sandy soils, but no further; but it rose 46in. in 195 days in clay soils before becoming stationary. It will at once be seen that with young vines or trees whose roots have not had time to penetrate deeply that the clay soils will not require as frequent irrigations as the sandy soils. Further careful tests have been made to ascertain the maximum amount of hygroscopic and capillary water various soils will hold to a depth of 8ft. and the following results were obtained:—Clay soil, 19 per cent. by weight; loamy soil, 16 per cent. by weight; very sandy soil 14 per cent. by weight. Gravity water is that water which moves downward through the soil pores because of gravity. It first of all satisfies the hygroscopic

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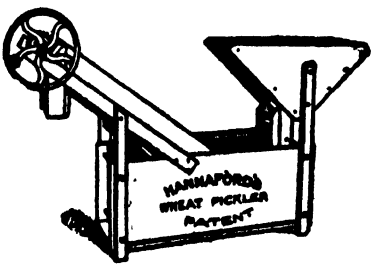
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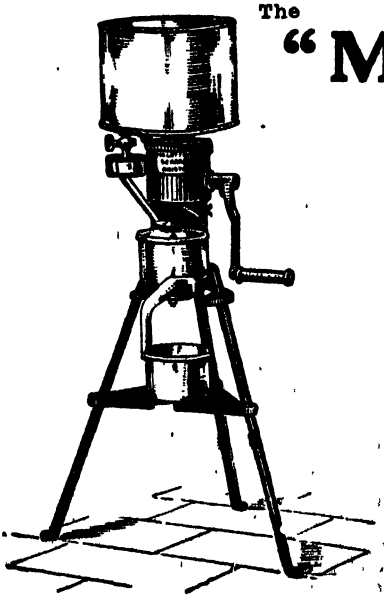
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and capillary capacity of the soil and then collects on top of the first impervious stratum it reaches and is the cause of many of our troubles. The pores in soil vary from 30 per cent. for sandy to 60 per cent. for clay soils. For the best plant growth air and water should be in equal amounts, as water is purely the conveying agent of plant food, while the air is the chemical agency through which the plant food is rendered available, and it is also indispensible to the life of the myriads of bacteria, worms, ants, spiders, &c. which enrich the soil. The minimum amount of moisture in the upper 4ft. of soil on which various fruits can subsist is as follows:—Apricots and olives, ⅛in.; citrus and figs, 1½in.; almonds and prunes, 1⅛in.; walnuts and grapes, 2in These figures, however, are apt to be rather misleading for old-established orchards, as no note has been made as to the root growth below 4ft. Strange to say, vines will penetrate as deeply as any deciduous trees in well-drained soil and have frequently been found 20ft. to 24ft. down, and even citrus roots penetrate 6ft. to 8ft. For deciduous trees and vines permanent water must not approach within 7ft. Capillarity renders the next foot saturated. Unfortunately, a very great area of our irrigation lands, even those artificially drained, have permanent water closer to the surface than 7ft., and under our primitive methods of draining it is too costly to cut drains deeper. Until we are prepared to stand the expense of having a geological survey of our substrata made, and of obtaining mechanical drain excavators, we shall never achieve any really great results in our underdrainage schemes. Soils very seldom have less than 8 per cent. of water in the first 8ft., which is equivalent to a depth of slightly over 9in. of water. Water applied to the soil is used for plant transpiration, evaporation, percolation, and run off. The evaporation from saturated soil exceeds the evaporation from a water surface, and draws the salts to the surface. There is an all-too-prevalent habit of flooding land instead of confining the water to furrows. This practice cannot be justified, except on extremely sandy soil, or on any soil where deep drainage has just been provided, and it is desired to drive the salts down into the drains. Flooded lands always dry out sooner than furrowed lands, because the water seals the ground and destroys the bacteria and other life in the soil, thus preventing Nature's system of mulching. A fermentation of the vegetation is set up and toxic poisons formed. Portions of the land furrow irrigated are crying out for mulching, but have to be neglected because the flooded land is too wet to work. Many settlers complain that their land is too hard to furrow out. Any soil that is in that state prevents the proper spread of roots in the dormant period. No settler can expect payable crops unless his soil is in good tilth, because trees and vines are never idle, and in the winter are busy extending their roots. Unless the irrigation water is dangerously saline, all orchards should be irrigated in the autumn and ploughed deeply and planted to cover crops. Unless all the soil is thoroughly watered, the roots will only draw upon a limited portion of the soil for their food. The aim should be to make the roots penetrate all the soil. It is impossible to estimate exactly how far percolation extends. The only sure method is by testing, which is comparatively easy. The gimlet end is cut off a 2in. auger and the shaft is cut, the end being thickened and threaded to fit inside a 1in. pipe socket. A few 2ft. lengths of pipe are cut and the handle end of the auger shaft is also threaded to fit a 1in. pipe socket. A spoke makes an excellent capstan for turning the boring plant and lifting it out. By examining the core, it will soon be seen whether the irrigation has effectively soaked all the soil. If it has not, a longer soaking or closer furrows are necessary, or a dressing of gypsum may prove valuable. When head ditches are placed too far apart the water at the upper end of the furrow percolates beyond the reach of the roots and takes much of the plant food with it. Besides a big waste in pumping, it may aggravate the drainage problems, too, by augmenting the subsoil waters. While head ditches take up ground, an even watering of the orchard will more than compensate for the loss of area. Again, the boring plant will put you on the right track. A very common system of watering adopted in California is as follows:—The orchards are furrowed transversely to the slope and then down it, and the furrows are then opened out. This is a very effective system on steep sloping grounds. For very sandy soils the American system of ridging up a square around each tree and flooding same rapidly and then shutting off has much to commend it, but is very laborious. I feel sure that with the proper application of water, three irrigations are sufficient for all crops except citrus; that is purely for the maturing of the crops. But, in

addition, commencing from the first year's planting, a cover crop should be provided. Unless heavy rain falls by the middle of April, an extra irrigation should be taken. In a winter such as the one just experienced, when no soaking rain occurred, an early watering, not later than the middle of September, should be provided, so that the cover crop can be ploughed in deeply. This deep ploughing is essential, because it gives the top soil a thorough aeration and sweetening, and it places the cover crop at sufficient depth for the maximum number of bacteria to attack it and render it available in its constituent chemicals for plant food. By turning in the cover crop so early, the equinoctial winds are generally avoided, and following on the autumnal ploughing the ground should break up into a very fine tilth. If showers occur, the soil requires a very light stirring to re-establish the mulch. Land that has been kept in good heart and not cropped without manuring nor over-irrigated with the resulting loss of humus, will not require another irrigation until well into October. To my mind, this is the most important irrigation of the season. The foliage has not grown sufficiently to provide much protection from the wind or sun and it is essential that the water be confined to the furrow, so that the land can be cultivated as soon as possible. The second general watering is hard to arrange, as a compromise has to be made with the apricot growers. Were it not for them, I think the first week in December would be early enough to commence. Again, we have to compromise with the final watering, and if it is practicable for the channels to supply the water economically, currants should first be watered just before the picking commences, then sultanas, and last of all Gordos. It would undoubtedly mean higher water rates, but far less working of the blocks, and the avoidance of specials at the time of the year when the water is charged with deleterious chemicals. Unfortunately, there is so much inter-planting that we shall always have to muddle along, suiting comparatively few, and not getting by any means the best results. Apart from the number and dates of waterings, on which we shall never reach unanimity, undoubtedly the greatest troubles

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this area is beset with are over irrigation, the flooding over the surface of the soil, and insufficient deep cultivation. To the man starting an orchard or vine yard, my advice is 'Do anything rather than skimp grading.' Secondly, 'Remember that Nature has provided for the natural production of herbage and trees, and that by the application of water you are upsetting the balance; therefore, start immediately with the production of humus.' Thirdly, 'Air in the soil is equally important as water to sustain the life of the bacteria, therefore furrow deeply to avoid flooding and the consequent drowning of the bacteria.' Fourthly, 'Sample the soil with an auger until you have learnt exactly how much water you require to thoroughly moisten the top 4ft. of soil, and the proper distance to place your furrows apart.' Finally, 'Remember that water is only the conveying agent of plant food, but without it nothing grows, so never neglect to provide a good mulch in order to keep the moisture handy to the roots.' While the roots of the trees and vines may penetrate to a depth of 8ft. or 10ft., the first 4ft. of soil provide the most plant food, as pure air is essential to the health of the bacteria, and the deeper one goes the less change of air takes place.'' At the conclusion of the paper the chairman called for questions or discussion. Mr W. J. Connolly asked whether salt was more frequently found in mallee land than in box country. Major Tolley said the question of salty land was one with many problems. The planting of mangels was good; couch grass also took up salts. The question of watering under the vines or in furrows was one for individual decision. He thought it better to water down the centre of the row. Mr. Connolly said it was a Mildura practice to water under the vines, and Mr. Basey remarked that on one patch of vines he used the syracuse hoe and kept the water away from the centre. Major Tolley considered that deep drainage was the only true solution, and that it should be done on a proper plan. He was in Fresno in 1912, where 40,000 acres had gone out through seepage. A geological survey was made as a first condition in order to concentrate the drainage, and then drains 2ft. in diameter, with laterals, were put in and reclaimed the whole land, the vines were restored and made wonderful progress. After the drains were in, the area was banked up and the whole area flooded to drive the salt into the drains. The benefit of subsoiling was advocated by several speakers, and Major Tolley said that on one block at Block E he had found a hard clay bed only 4in below the surface. Some ground which he had found hard to break with a pick had been trenched and now took as much water as he could pour on it. Mr. L. Darrington asked what was a fair depth for drainage, and Major Tolley said a soil auger was needed to find out how the clay subsoil lay, and so discover whether the drains could lie on it. As a general rule about 7ft. was needed. At the Berri Experimental Orchard a contour plan was made showing the clay beds. America generally claimed to be years ahead in her methods, but had made a serious mistake in Nevada, where the water was led into a big reservoir, and let out on the land, which was subdivided into 80-acre blocks, and it was found that clay dykes were running diagonally across the fields, and in three years the whole area went out—salt could be scooped up with a shovel. He was a great believer in green manuring; with chemical manures it was sometimes open to doubt if the proper constituents were being used, but with green manure there could be no mistake. If the cover crop was hard to turn in, run over it with a straight set disc first. In reply to Mr. Geneste, Major Tolley said he would not recommend flooding at any time.

BERRI, January 7th.—The Deputy Horticultural Instructor and Manager of the Berri Experimental Orchard (Mr. C. G. Savage) attended the meeting and delivered an address, "Preserving Fruit," to an excellent attendance of members and visitors.

COOMANDOOK, November 14th.—The annual Farmers' Drive of the district was held on November 14th, when the manager of the Kybybolite Experimental Farm (Mr. L. J. Cook), accompanied by a large number of members and visitors, inspected the holdings of Messrs. Chapman, Ninnes, Plew, Le Gallez, Trestrail, Cox, Davis, and Williams. In the evening Mr. Cook delivered an address, "Grasses and Fodder Crops," to an audience of 20 members and 18 visitors.

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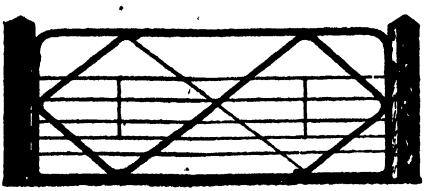


Fig. 201.—Cyclone "Z" Gate.

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COONALPYN, January 18th.—Mr. Cronin read a paper, "Farm Buildings," that had been prepared from notes obtained at the 1923 Winter School for Farmers, and an interesting discussion ensued.

GLOSSOP, December 21st.—Mr. James gave a short address, "Comforts and Conveniences on the Block," and an interesting discussion ensued.

KRINGIN, January 3rd.—The inaugural meeting of the Kringin Branch of the Agricultural Bureau was held at Mr. G. Guthleben's residence on January 3rd. Seven members attended, and the Acting Secretary (Mr. F. C. Tee) briefly explained the aims and objects of the Agricultural Bureau. Officers and a programme committee were then elected.

SOUTH AND HILLS DISTRICT.

BALHANNAH.

December 21st.—Present: 27 members.

POTATO GROWING.—The following paper was contributed by Mr. V. Spoehr:—"In selecting seed potatoes care must be taken to have seed of the best quality, free from all diseases, with a smooth skin and good shape. If imported seed is desired I prefer selecting Victorian potatoes of prime table-quality. If this is done, there is less danger in growing potatoes from run-out stock, which some growers are too willing to pass out as no good to them. If saving your own seed potatoes, select the best part of the bed for seed, and when digging save the best potatoes for seed. I prefer potatoes that are dug from black loam for planting on red loam and *vice versa*. From experience, it does not pay to plant your own saved seed always, hence a change of seed is necessary. Never save seed from a poor crop. When the seed potatoes are received they should be emptied out of the bags at the first opportunity, and spread out as thinly as possible, about two or three potatoes thick. I prefer storing the seed in a loft on bare boards, where they will not be affected with hot weather, and where they have plenty of light. Both ends of the loft should be left open. Light is the main factor in making the seed as green as possible. The greener the seed is made the sturdier the shoots will be, and they will also be less liable to rot if rain falls after planting. When the top potatoes are green and beginning to shoot, take a narrow tyned fork and turn the potatoes over, bringing those on the bottom to the top, in order to make them thoroughly green. Turning the seed in this way will check over-development of the shoot on the lower layers of potatoes. Great care must be taken not to injure or break off the shoots at any time in turning. If the seed is ready for planting, and the land not ready or the weather unfavorable for planting, turn the potatoes again at intervals of a week or so. Plough the ground intended to carry the potatoes about 3in. or 4in., about July or August, if weather conditions are suitable. Under no circumstances must the ground be worked if it is too wet. In ploughing bury all grasses. Harrow the ground twice and allow it to lie until September, then work the cultivator, harrows, and roller, and finally work the plough to a depth of 6in. or 7in. If the ground is inclined to be cloddy, first use the roller, then the harrow, and then the roller. Cultivation of the land before planting is most important, and if the land is not in good condition, delay the planting until it is in good order, otherwise good results cannot be expected. Land can be worked better before planting than after. When planting, take the seed potatoes out in boxes, using a fork to fill the boxes. Handle the seed very carefully in order not to damage or break off the shoots. When cutting large potatoes, allow two eyes to each set, and then place them into the bucket used for planting. Never tip the seed out of one bucket into the other for fear of rubbing off the shoots. I find it better to cut the potatoes as they are required for planting. Plough to the depth of 4in. for planting. Deep planting is often the cause of irregular crops. If the horse is made to walk on the land the potatoes can be placed on the bottom of the cultivated soil and in the centre of the furrow. Make the ploughing as straight as possible, taking a 9in. furrow and planting every third furrow. The manure should be applied on the land just before planting, using about 6cwts. to 10cwts. to the acre. Super and bonedust have given the best results. As soon as the

potatoes are planted, harrow and roll the soil to make an even surface and conserve moisture. When the potatoes are just showing above the ground or have made up to 9in. growth, harrow them with a pair of steady horses, taking care not to allow the horses to tread on the bushes. Cultivate with the horse-hoe about a fortnight later, setting the cultivator or horse-hoe as wide as possible without injuring the bushes. Use a very steady horse for the first scarifying. If weeds become prevalent, or heavy rains fall, another scarifying will be necessary. If the second scarifying is performed set the scarifier to cut a narrow strip of soil, so that the fibrous roots of the plants are not injured or disturbed. If the crop is irrigated do not give the plants too much water at once, or there will be a danger of causing the tap-roots to rot. A little and often is the best plan to adopt when watering. So soon as the skin of the potato has set, watering must immediately be discontinued; if not, the consequences are that the potatoes will grow 'nobby.' Never plant potatoes more than twice in succession on the same ground, otherwise the development of diseases will be encouraged."

CYGNET RIVER.

November 20th.—Present: seven members.

LUCERNE GROWING.—The following paper was read by Mr. H. L. Moar:—"To raise a crop of lucerne successfully one must obtain good reliable seed. Preparing the land is a very important step, and requires considerable care and perseverance. Rich sandy land is most suitable, because of its naturally loose nature and because of the heat. From land of this class about two good cuts

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more are obtained than from the heavier soils. Lucerne flea causes more damage on the heavy soils. The land must be ploughed and reploughed, harrowed, rolled, and graded, the latter requiring skill and patience, because if it is intended to irrigate by gravitation, and the land is not properly graded, trouble is sure to follow. Well-graded land is also necessary for mowing the crop when it is matured. Then comes the planting of the seed; some like planting in late autumn, while others favor spring sowing. Owing to the fineness and lightness of the seed, some growers make a practice of mixing it with sand and broadcasting carefully, whilst others mix it with super and sow it through the drill. The rate of sowing varies from about 8lbs. to 12lbs. per acre. Do not sow too thinly, because a thin crop will not make a high growth. As soon as the crop is high enough to cut, it must be mowed. Some feed off the crop, but that is detrimental to the plant if it is required to stand for years. The first cut must be made as soon as the lucerne is high enough; if this is not done, the first crop does not grow quickly and checks the following crops. After this the matter of cutting each successive crop requires due attention. When the crop is about one third in bloom, or when young shoots are showing at the bottom of the plants, no time should be lost in putting the mower into the crop. For the man who irrigates, the portion just cut must be immediately flooded if he wishes to obtain maximum returns from the plot. It is a good plan to broadcast super after each cut. Each season, in the very early spring, or just before the growth commences, the lucerne should be well harrowed. You can hardly work it too much. Work the plot east and west, north and south, and diagonally—in other words, from all points of the compass. It is also beneficial to add from 1cwt. to 2cwts. of super during the cultivation operations."

CYGNET RIVER.

December 18th.

TOMATO CULTURE.—The following paper was read by the Hon. Secretary (Mr. F. J. Wakelin:—"The successful cultivation of tomatoes on a commercial scale requires a good deal of thought and attention, from the time the seed is planted in the bed until the crop is picked. I find that good rich loamy sand, such as we have on the river flats, is most suitable for the growing of tomatoes. First, the land should be thoroughly ploughed to a depth of 6in. or 8in. about six weeks harrowed six to eight times. The climatic conditions that prevail on the island before planting, and during that time it should be reploughed, cultivated, and enable the careful grower to produce tomatoes to perfection without irrigation. The raising of good, strong, sturdy plants is very important, and this means the careful preparation of the seed-bed. Early in the season the bed should be covered with glass to provide shelter and to force growth. As the plants make headway they can be uncovered. When a large area is to be devoted to tomatoes, it is not always possible to procure enough stable manure, therefore I recommend an application of guano super or bonedust dug into the soil around each plant. In good land, and where the tomatoes are likely to make strong growth, the rows should be 6ft. apart and the plants 2ft. apart in the rows. This will enable a two-horse team to be used for cultivation, but as the bushes spread out it will be necessary to work a smaller cultivator. Transplanting, which is usually done in November and December, is a delicate operation on account of the hot weather. It is better to wait for a cool change, and if it rains, so much the better. In taking up the plants from the bed do not injure the roots, and the same care must be taken when planting out. After a few days a few plants will, in all probability, have died. These gaps should be filled in as soon as possible. After all the plants are established, keep the land well cultivated, especially after every rain. When the bushes are flowering the double flowers, which usually form on the top of the bushes, can be pinched off, because they only produce wrinkled tomatoes, which are useless. The Early Dwarf is a very good variety for early planting, and for later planting many different kinds can be recommended." The discussion which followed was interesting, after which exhibits tabled by members brought forward interesting comments.

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HARTLEY (Average annual rainfall, 15in. to 16in.).

November 20th.—Present: 10 members.

Mr. J. M. Hudd gave an interesting address, "Advantages of the Milking Machine."

WEEDS AND RABBITS.—At a further meeting held on December 19th Mr. N. L. Whellar, in the course of a paper, "Things We Don't Want on the Farm" first referred to the spread of boxthorn, and whilst admitting that kept under control it made a good hedge and breakwind, he said it was a source of annoyance when it spread in the paddocks. When the boxthorn became a nuisance he suggested that the plants should be pulled out by the roots with the aid of a horse and then stacked and burnt. Prickly pear was also a troublesome plant. To deal with the pears effectively he advised rooting up the plants and then stacking them on old bushes ready for burning. Mr. Whellar considered the star thistle one of the worst weeds of the district, and as they were not yet very plentiful in that locality, he urged every landholder to spare no efforts in destroying the plants. As a means of dealing with the thistles he advised digging up the plants just before the flowering stage, and then either burning or burying them. Many methods were used to try to keep rabbits under control, but he believed the most effective plan to be that of smoking out the burrows. The plan he adopted was to cover a piece of old bagging with tar, push it down the burrow, and then set fire to the bag. When the tar was thoroughly alight, the hole should be closed in. To make certain that the job had been effective, the burrows should be inspected every day for a week, and any holes that had been opened should be filled in. It was also advisable to muster any sheep that were pastured in paddocks in which rabbits were present, before smoking out the warrens. That would have the effect of driving most of the rabbits into their holes.

KANGARILLA.

November 23rd.—Present: 12 members and three visitors.

DAIRYING.—The following paper was read by Mr. R. Guthberlet, a farm apprentice from England:—"The first point to be considered in the successful management of a dairying proposition is the provision of accommodation for the cows. It is not necessary to go to the expense of erecting a shed of a specified type; almost any shed, providing it is large enough, can be converted into a good cow-house. The building must be well drained, lighted, and efficiently ventilated, otherwise the health of the cows will be affected, and there is the constant danger of contaminating the milk. When providing for light to enter the sheds, care must be taken that the sun cannot shine directly upon the cattle. Have a passage of at least 4ft. 6in. behind the cows, and also a gutter, so that after the bails are washed they will be thoroughly drained. A good plan is to concrete or brick the floor. This will make a better job of it, and save much time and labor. The floor should be washed after each milking, and if water is laid on, the byres can be hosed. The walls should be whitewashed at least twice a year. It will be found that if a small quantity of fat or grease is added to the whitewash it will adhere to the walls. Have a bail for each cow if possible, and a box or trough, so that the animals can feed in comfort whilst being milked. Do not bring the cows in with a dog, or use sticks to place them in their bails. More good can be accomplished by kindness than by force. The latter only excites the cows, and reduces the milk supply. Milk regularly, and space the milking periods as near to 12 hours apart as possible. Anything that tends to upset the regular order of a cow's day reflects itself in the milk pail. Give the cows eight weeks' rest before calving, and do not forget to feed them generously during this time. If she calves in poor condition, she will not make a good show at the bucket. It may not be practicable to groom all the cows thoroughly daily, but it is quite feasible to keep the flanks clean and free from cakes of dried manure. When turned out to grass, cows should have access to a good supply of fresh, clean water. Wheaten chaff is the best feed to give cows in the winter. Lucerne and Sudan grass are capital summer fodders. The latter should be sown about November and the lucerne in March or September. One of the best methods to ensure the quality of cream is to keep the separator clean and free from dirt. If

dirt is allowed to accumulate in the bowl of the machine or in various parts, it will taint the cream. The separator collects many of the impurities of milk, and unless great care is taken, these germs and other kinds of refuse will find their way into the cream. The separator should be washed thoroughly after each time of using. It is also a recognised fact that a separator that is thoroughly clean will skim more closely than one which is dirty. It is a good plan to flush out the bowl with clean water after each separation while the machine is still running, and until the discharge from the skim milk spout is clear. This will remove most of the particles of milk and cream which stick to the separator parts, and will enable the subsequent washing of the machine to be done more easily. The bowl should then be taken apart, and all parts scrubbed with a brush and hot water, to which has been added some good washing powder. The parts should then be well rinsed with scalding water and allowed to drain in a clean place. In choosing cows, it is advisable to select a type of cow which is suited for the climate and district. The Jersey-Shorthorn cross I consider the type of cattle suited for this district. A desirable dairy cow should be deep through the chest and have a wide spring of forerib. This chest cavity contains the heart and lungs, and in order to do their work properly they must have ample room. The shoulders should be fine, and free from any coarseness. The vertibrae should be very open from the shoulders along the back and free from flesh. This would not be the case with dry cows that would soon freshen, nor in heifers that are below the milking stage. A great change very frequently takes place in the structure of the shoulders during the first lactation period. The neck should be clean cut and fine, neatly attached to the body, and free from any coarseness of superfluous flesh. The head should appear fine, the veins standing out prominently on the face, with the head free from any 'meatiness.' The eyes must be large and bright and full, and the nostrils very wide. The animal should have a large broad mouth and a clean powerful jaw. The head should be clean cut, showing intelligence and temperament. I prefer an udder of which the attachment to the body is both long and broad, coming up well behind and joining the body smoothly in front. The bottom should be level, and the teats of medium size, placed well apart and squarely upon the udder. I like to see an udder that is covered with a network of prominent veins. When milked out, the udder should be soft and pliable and free from any indication of 'meatiness.' In a good cow the milk veins are long, crooked, and branching, entering large and easily discovered openings. Veins that are long and branching are much to be preferred to shorter heavier veins. In superior animals a well-defined middle vein is often noticed. The hide should be soft, pliable, and covered with soft, fine hair.'' In the discussion that followed, one member stated that cows could be kept clean by using clippers and clipping round the udder and flanks. Some members considered that one bail for each cow was unnecessary, and when a large herd was kept it meant keeping a very large plant. When on muddy land it was a hard matter to keep the teats free from dirt. In the case of a cow being blown, Mr. G. Connor stated that he had effected a cure by puncturing the side of the cow with a penknife. Another method was to place about 4ft. of small hosing down the throat of the animal. Another member did not favor crossbred cows, because that meant the keeping of two distinct herds to produce the cross, and there was a danger of getting a ''beefy'' cow.

MOUNT PLEASANT (Average annual rainfall, 26.87in.).

December 14th.—Present: eight members.

CATTLE FOR THE SMALL LANDHOLDER.—In the course of a short paper dealing with this subject, Mr. E. J. Tapscott first gave an informative description of the Milking Shorthorn, Illawarra Shorthorn, Hereford, Ayrshire, and Friesian cattle. The Jersey he considered to be the most profitable cow for the small landholder. The cows were very quiet, rich creamers, and kept in milk over a lengthy lactation period. Being smaller cows than some of the other breeds, they did not require so much feed. The contention of some people that the Jersey cow was a delicate animal was hardly correct, because he had kept Jersey cattle right through the winter without rugging, and he held the opinion that if the cows were kept in good

condition they did not require rugging. There was, however, one disadvantage—i.e., the bull calves were not worth rearing, unless sold for stud purposes. In the discussion that followed, Mr. Vigar favored the dual purpose type of Shorthorn cows for the Mount Pleasant district.

BLACKHEATH, December 21st.—Mr. W. J. Pym read an instructive paper, "How to Improve Pasture Lands," to a gathering of 10 members and several visitors.

CHERRY GARDENS, December 22nd.—Fourteen members and approximately 90 visitors, including delegates from the Blackwood, Kangarilla, McLaren Flat, Longwood, and Iron Bank Branches, attended the December meeting of the Cherry Gardens Branch, which took the form of a social evening. Musical and elocutionary items and addresses, followed by supper, concluded a most enjoyable evening.

CYGNET RIVER, January 22nd.—Mr. A. C. Osterstock read extracts from the Departmental Bulletin, "Tillage of the soil," and a keen discussion followed.

KANGARILLA, December 21st.—The Vice-Chairman of the Advisory Board of Agriculture (Captain S. A. White, C.M.B.O.U.) visited the Branch and delivered an address, illustrated with lantern slides, "Across Australia by Motor Car."

A further meeting was held on January 17th when the question of preparing a Bureau exhibit for the Meadows Agricultural Show was discussed.

LONGWOOD, November 24th.—On Saturday, November 24th, members met at Mr. R. H. Lewis's residence and took the opportunity of inspecting the orchard and garden. An interesting paper from the *Journal of Agriculture*, "Rotation of Crops," was read by the Hon. Secretary (Mr. J. R. Coles).

TWEEDVALE, January 24th.—The Assistant Dairy Instructor (Mr. H. J. Apps) inspected the dairy herds of Messrs. E. Dearman and A. Sickerdick during the afternoon, and in the evening delivered an address, "The Dairying Industry," to a gathering of 17 members and three visitors.

SOUTH-EAST DISTRICT.

ALLANDALE EAST.

December 14th.—Present: seven members.

WINTER AND SUMMER GARDENING.—In the course of an address dealing with this subject Mr. A. Kieselbach explained at length the preparation of the soil for winter and summer gardening, the most suitable kinds of vegetables to plant, and the correct time of planting. In winter the garden should be prepared on the driest and warmest ground, provision being made for adequate shelter. The land should be heavily manured with stable manure or super. The preparation of the vegetable plot should be taken in hand immediately after the first rains. After the vegetables had been sown, thinning out was necessary in order to secure crops of good quality. In preparing for a summer garden, a site in an exposed locality should be chosen. If manure was used he preferred bone super. He planted melons and pumpkins 6ft. apart, and in the following order:—Watermelons, pumpkins, piemelons. Piemelons and watermelons should never be planted alongside each other, but pumpkins should separate the melons. In the discussion that followed, Mr. C. Griffin said pumpkins had formed on his vines, but had made no further development after reaching the size of a tennis ball and sometimes smaller. Mr. Kieselbach considered that it was due to the poorness of the soil. Mr. W. Laslett thought such a defect would be caused by imperfect inoculation. It was a good plan to inoculate the female flowers from the male. He had also found that pumpkins did better in the same ground each year if the soil was well manured. Mr. Kieselbach mentioned that if the ground was used every alternate year better results would be obtained. Mr. Butler said the manure of

the previous year was by then decayed, and supplied more plant food. Mr. C. Griffin asked, "What are the best pumpkins for this district?" Mr. Kieselbach recommended Iron Bark and Turk's Head. Mr. W. Laslett had found fowl manure the best for the garden.

POULTRY BREEDING.—In the course of a paper dealing with this subject, Mr. E. Jennings said White and Brown Leghorns were the best layers and they did not consume so much food as some of the larger breeds of poultry. Black Orpingtons were poor layers, but they were very useful for brooding purposes. The birds should be kept away from the house, and not allowed near the stack, because they scratched the seed and hay about. In a great many cases barley and oats were fed to the birds. That was a mistake, because those cereals were not easily digested and were also difficult for the birds to swallow. If, however, the barley and oats were crushed, they made a very suitable food, provided there were no long threads left on the seed. Wheat was the best grain for feeding. Shell grit should always be available in the pens for the birds. It was advisable to have early broods, say the last week in August or early in September, so that the pullets would commence laying early in the new year, about March or April. If that were done, eggs would be obtained through the winter. When sitting the hen, it was advisable to obtain eggs about a week old, and to sprinkle them with a little cold water. Young chickens should be kept in the coop for a few days, until they became strong and healthy, and in the meantime dry oatmeal should constitute their food. They should also be kept warm and dry, with plenty of clean water to drink. It was also essential that the tins be kept clean. When building a fowl-house, room was the most essential point to keep in mind. An enclosure 36ft. by 36ft. would provide plenty of space for the fowls. The front of the yard could be enclosed with 1½in. mesh wire-netting. Cutting grass made a good covering for the roof, because it provided for a supply of fresh air. Iron roofs were too hot and did not allow the necessary fresh air to reach the birds. In all cases it was most necessary to keep the fowl-house clean. The drinking utensils should also be cleaned every day, and fresh water given to the birds. Perches should not be built higher than 2ft., and they should be rubbed down every three or four days with kerosene. Laying boxes should be of a fair size, so that the hen would not be cramped. The sitting hen should be on the ground, away from the other birds, so that it would not be disturbed. Cabbage leaves when tied in a bundle made a good picking for the birds, as also did potato and apple peelings. After two years' service the flock should be culled and all aged birds fattened and sent to market. An interesting discussion followed.

KALANGADOO (Average annual rainfall, 33in. to 34in.).

December 8th.—Present: nine members.

TOP DRESSING PASTURES.—The Hon. Secretary (Mr. W. J. Evans) read the following paper:—"This is a branch of farming that is becoming more general every year, and, in my opinion, holds out great possibilities for the South-East. Practically any class of land can be improved by a top dressing of at least 1cwt. of super every fourth year. Although one of the latest settlers in the district, I have, from the first year that I took up land, been using super on grass land. My first experience was on an eight-acre block that had been sown the previous summer with millet and Sudan grass and grazed up to the end of May. After the winter rains I noticed there was a good patch of clover showing on this block, but it was not making much headway, and in August I decided to give it an application of super. The manure was applied at the rate of 1cwt. to the acre, with the discs of the drill set well into the ground. The result was wonderful, for almost immediately increased growth could be observed. I then decided to save this paddock and cut it for grass hay, and at the end of November I obtained 14 two-horse wagon loads off eight acres. The crop consisted almost wholly of Schanck clover, and did not appear to be in the land before it was top-dressed. This stack of hay was a great help to me in the winter months for feeding the cows

when there was very little other fodder available. After I had carted the hay there was a fair amount of feed in the paddock, and it was grazed through the summer months. The following season it was the earliest paddock of feed on the property, and six weeks after the first rains I put cows in that paddock, and it carried more stock for the rest of the year than any 25 acres on the farm. This year again it was one of the earliest paddocks, and is still showing the effect of the super, but it needs breaking again now and another dressing of super. The following year I top-dressed 15 acres of virgin land, and although it made good growth and stood out well from the other half of the paddock that was not treated, it did not show such marked growth as the land that had been broken the previous year. This year I dressed another 40 acres and noticed that where the land had been broken, such as rabbit warrens that had been filled in, and on fire breaks, the growth is far superior to that on unbroken land. Stock will graze on land dressed with superphosphate until the grass is almost eaten out by the roots and allow grass on land not fertilised to go to seed. This year I sowed about five widths of the drill around a paddock with super and left the centre untouched. Whenever a visit was made to the paddock the stock were always feeding around the fence, and now one can almost follow the last drill mark. I do not think it matters what time of the year super is applied to the land, so long as it is not left until too late in the season. I would, however, prefer August or September, because that would force the grass just when it started to grow. A good rotation would be first year oats, second year super and a cut of grass hay, third year grazing, and plough again for oats in the fourth year. I would apply 1cwt. of super every third or fourth year, rather than put on a heavier dressing and leave the land for an indefinite period. I have proved to my own satisfaction that top-dressing pays, because it gives more feed, better feed, and healthier stock, which means a bigger profit and less worry to the farmer." An interesting discussion ensued.

MOUNT GAMBIER (Average annual rainfall, 32in.).

December 8th.

An instructive paper, "Milk Fever," was contributed by Mr. G. Hill, and a keen discussion followed.

NARACOORTE (Average annual rainfall, 22.60in.).

November 10th.—Present: 11 members.

BINDERS AND BINDING.—With memories of haymaking before the days of the binder still in mind, Mr. C. Bray read a paper entitled "Binders and Binding," mentioning that he looked upon the binder as one of the "greatest pieces of harvesting machinery ever invented." To ensure its smooth running there were many parts which required close attention. The main driving chain was, of course, the pivot upon which all the other machinery depended, and once that went wrong it put all the others out of action. The knotter was another essential part. There was nothing more annoying to the driver than to see loose sheaves being tossed out, especially if he could not find the cause, which was very often a puzzle to unravel. The least little thing would often cause it. Sometimes just a turn of a nut with the spanner would remedy it. At other times the tongue of the knotter would become spread through a gripping knot in the twine: closing it slightly with the pliers would rectify the trouble. "I find it a good plan to take notice of any parts that are geting worn when finishing up the season while they are fresh in one's memory, so that they can be attended to before starting another season," he concluded. An interesting discussion followed. Mr. W. Loller, whose harvesting experience had gone back to the days of the scythe, the grass-mower, and the old side-delivery machine, regarded the modern binder as a great improvement. Mr. E. S. Alcock mentioned that the successful working of the binder depended greatly on the farmer's understanding of the machine; he became accustomed to the one he used and usually preferred it to other makes for that reason.

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

No. 8. MARCH 15, 1924. VOL. XXVII.

Published Monthly by the Department of Agriculture.

Edited by H. J. FINNIS.

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JOHN COWAN,
Minister of Agriculture.

Orchard (Mr. R. Fowler) stated recently that the test gives promise of very interesting developments. Photographic records of the trees at different stages are being taken, and these, in conjunction with other data, should prove a useful guide to orchardists.

Australian Wheats in North Africa.

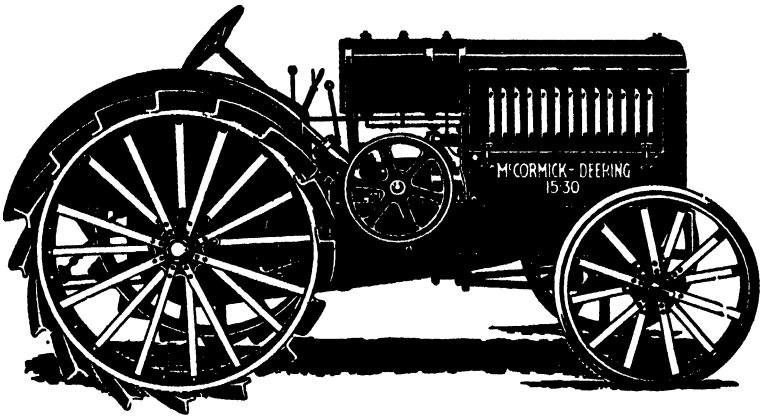
Of a large number of varieties of wheat from many countries tried in Morocco for the purpose of determining the type most suited to local conditions, a South Australian bred wheat, "Rajah," has proved itself to be best, according to an official report recently presented to the Acadamie d'Agriculture de France. This wheat is one of the three-quarter bred King's varieties produced some years ago at the Roseworthy Agricultural College by the Superintendent of Experimental Work (Mr. W. J. Spafford) during the time the Director of Agriculture (Professor Arthur J Perkins) was Principal. Quite a number of the progeny of this particular cross has done well in South Australia, two outstanding examples being Sultan and Felix.

Not only was this South Australian wheat proved by actual test by the Department of Agriculture in Morocco to suit the requirements of wheat growers there better than any other, but other Australian wheats stand very high in the table of relative values. In the first nine, besides Rajah, there were Fan, Baroota Wonder, Iguana, Thew, and Bearded Gluyas. Fan is one of the types bred by the late William Farrer, which has proved an extremely good parent in cross fertilisation, and which forms part of the stock of many of the Roseworthy Agricultural College varieties. Baroota Wonder is a selection from Ward's Prolific, made by Mr. G. Crittenden, of this State. It is a good hay wheat in the early districts. At the Government Experimental Farm, Minnipa, the variety is being worked on with the object of selecting good strains. Iguana is a Roseworthy Agricultural College wheat which is by no means well known in this State, but has had a measure of popularity in other States of the Commonwealth. Thew is another variety produced by the late William Farrer, which was at one time a very popular wheat, but it has been displaced in many districts by more recently introduced types. Bearded Gluyas is a Roseworthy Agricultural College selection from Gluyas, itself a selection made by Messrs. Gluyas, of this State.

Besides these varieties, Sultan, College Eclipse, and King's Red are also mentioned as being satisfactory for the North African conditions under notice. All of these are Roseworthy Agricultural College wheats, and they are all growing in popularity in various States of Australia. College Eclipse has had quite a vogue in the neighboring State of Victoria during recent years.

The Apple Crop.

After having personally seen a considerable portion of the fruit-growing localities, and also discussed the seasonal prospects with growers and inspectors from the various fruit districts, the Horticultural Instructor (Mr. Geo. Quinn) stated that the apple crop this year is, generally speaking, not only a good one, but the quality of the



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fruit is fine, and its freedom from Black Spot and Codlin Moth is very marked. This is very gratifying in view of the fact that in the earlier period of the growth of the fruit, the season was exceptionally wet, and one calculated to result in the development of Black Spot and other fungous diseases in abundance.

Herd Testing at Murray Bridge.

In a report on the third year of operations of the River Murray Herd Testing Association, prepared by the Director of Agriculture (Professor A. J. Perkins), and issued in bulletin form by the Department of Agriculture, a comparison is made of the results over the three years of the herds which have been under test for that period. This reveals that the average milk production per cow, which was, for the first year, 648.42galls., in 1921-22 rose to 692.57galls., and in 1922-23, to 719.82galls. Similarly the average butterfat production per cow rose from 285.87lbs. in 1920-21, to 305.83lbs. in 1921-22, and 315.76lbs. in 1922-23. Hence, since the first season, the average improvement in these herds has been represented by 71.4galls. milk, and 29.89lbs. butterfat. At 10d. per gall. for milk, this represents average improvement in gross production per cow of £2 19s. 6d. per annum. Tables showing the average daily milk yields, month by month, during the three years' operations of the Society, reveal remarkably even production from the herds from one end of the year to the other. Relatively to the total number of cows in the herds, whether dry or in milk, the milk yield averaged 2galls., a day over a period of seven months, *i.e.*, from August to February, inclusive, and 1½galls. over the remaining five months, *i.e.*, from March to July. Relatively to cows actually in milk, and exclusive of dry cows, the average milk yields have been about 2½galls. from August to February, and 2galls. for the balance of the year. Similarly, a comparison of the average daily butterfat production, month by month, for the three years, reveals what Professor Perkins has referred to as an "extraordinary regularity in butterfat production from one end of the year to the other." From the point of view of the total number of cows in the herds, the extreme monthly variation is about one-tenth of a pound, and from the point of view of cows actually in milk, about three-twentieths of a pound. The mean percentage tests, on the other hand, show more pronounced variations, being highest in the months of declining milk supplies. Butterfat production appears to all intents and purposes to be a fixed quantity from one end of the year to the other, notwithstanding seasonal variations in percentage tests. When tests are abnormally high, it may be inferred that milk production is on the decline, and *vice versa*.

Chickens at Parafield Station.

There are now some thousands of White Leghorn and Black Orpington chicks at the Parafield Poultry Station, where a record percentage has been secured in hatchings this season. These were summer, or, as it is often called, autumn hatched—a practice which

has been the rule at this Poultry Station for many years. The Poultry Expert (Mr. D. F. Laurie) explains that experience has shown that chickens hatched after the first week in October are seldom worth rearing, yet chickens hatched in February and March thrive and make fine birds. In the case of table birds, a chicken so hatched comes in at a time when the market is bare of good quality and when prices are high.

Cost of Feeding Dairy Cattle.

In addition to the production of the cows, the quantity of food consumed by the Ayrshire herd at the Government Experimental Farm, Kybybolite, is carefully recorded. During the 12 months ended September 30th last, the average quantity of feed given to each cow in the herd was, according to the Manager of the Farm (Mr. L. J. Cook), as follows.—Hay chaff, 14cwts. 3½qrs.; ensilage, 1 ton 16cwts.; bran 11bush.; oats (crushed) 33½bush.; greenfeed 4.4cwts.; pasture four acres. Valuing hay chaff at £4 per ton; ensilage at £1 per ton; bran at 2s. 2d. per bushel; oats at 3s. per bushel; greenfeed at 10s. per ton; and calculating the rental value of pasture at 4s. per acre, the cost of the food of each individual cow for 12 months works out at £11 18s. as against the value of the production per cow for the same period, £23 5s. 5d.

Pure Bred Dairy Bulls.

The Department of Agriculture has issued an invitation to breeders of dairy cattle to submit bulls for sale at auction under the provisions of the Dairy Cattle Improvement Act. Arrangements have been made for a sale to be held on the Show Grounds on March 27th, the day of the Murray Bridge Agricultural & Horticultural Society's Show. From the purchaser's point of view, the chief attraction of this sale lies in the fact that he may buy a sire for his herd, and immediately claim from the fund established under the Act referred to above, a refund of 60 per cent. of the purchase price up to £60. He is also assured that the animal purchased will be true to type, well grown, free from tuberculosis, and the progeny of a dam which has reached a satisfactory butterfat production standard.

Fruit Fly.

In view of the somewhat alarming reports in a section of the Victorian press dealing with the appearance of fruit fly at Mildura, action has been taken by the Horticultural Branch of the South Australian Department of Agriculture to secure definite information with respect to the nature of the outbreak. Accordingly, Mr. C. G. Savage (Manager of the Berri Experimental Orchard) has been dispatched to Mildura, with the object of observing on the spot the distribution of the pest and the nature of the steps taken by the Victorian Department of Agriculture to suppress it. This precaution has been taken by the authorities in South Australia also, with the object of being prepared

to deal with any outbreak should it occur in any of the irrigation settlements in this State. When questioned on the matter recently, the Horticultural Instructor (Mr. George Quinn), stated that although the chances of the pest being introduced into South Australia were somewhat remote, it was to be hoped that travellers passing from Victoria down the river to South Australia would lend their loyal support to the authorities charged with the duty of keeping the State free of this and similar noxious insects, which could be best done by refraining from sending or carrying any fresh fruit from the Victorian or New South Wales irrigation areas into South Australia.

Obstructing a Fruit Inspector.

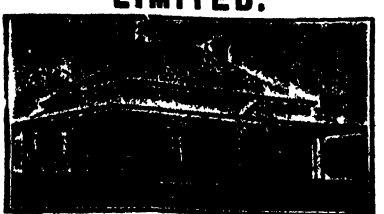
Orchardists in South Australia as a general rule adopt a most friendly attitude toward officers of the Horticultural Branch of the Department of Agriculture who are charged with the administration of the Vine, Fruit, and Vegetable Diseases Act. This legislation is designed to bring about the suppression of pests which, left uncontrolled, are capable of very seriously affecting the fruit industry, and because of this, growers as a rule loyally support the inspectors in their work. An example to the contrary, however, occurred during the past week, when a grower in a lower northern fruitgrowing district was proceeded against in the local court for obstructing the inspector and accompanying his obstructions with threats of violence. The court fined the grower £2, and court fees amounting to 15s. This is the first occasion on which it has been found necessary to take action of this nature under the provisions of this legislation.

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Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Replies furnished by Mr. A. H. ROBINS, B.V.Sc., Stock and Brands Department.]

"L. A., Port Lincoln, has aged medium draught mare, good condition, head swollen, eyes partly closed and discharging redish fluid, A little "groggy" on legs.

Reply—The horse is suffering with a condition known as *Purpurea haemorrhagica*, and, under the circumstances, her chances of recovery are exceedingly slight. Such a condition can be handled with any great chance of successful issue only by qualified veterinary surgeons. It is usually a condition arising secondarily to other diseases, such as strangles, influenza, &c., though it sometimes appears with no history of pre-existing illness. It may, in a general way, be considered a form of general blood poisoning.

"W. G. S.," Cowell, asks for cure for disease in sheep locally known as "pink eye."

Reply—Unfortunately it is not possible by any system of internal medication to effect a cure of this condition of sheep's eyes, or to prevent its further spread. The only combative measures are isolation of those animals affected from those which are sound, and the application of local treatment to the affected eyes. The necessity for isolation arises from the fact that flies are a very active agency by which the disease is spread in the flock after it once makes an appearance. The condition may, in some cases in the commencement, be due to grass seeds getting into the eyes, but it is commonly set up by the pollen dust thrown off by the grasses and wildflowers in the wilting stages. This pollen dust getting into the eyes while they are grazing, sets up intense irritation and inflammation. The flock should, if possible, be kept on short grass. The following treatment of affected eyes is simple and effective:—Clean the eyes first by bathing with warm boracic lotion. Then put in a few drops of the following lotion:—Boracic acid, 1 dram; distilled water, 1 pint. Repeat three or four times daily. If possible, keep affected sheep in a shady position.

Hon. Secretary, Shoal Bay Agricultural Bureau, reports horses falling off in condition, and slobber at mouth.

Reply—Have a close and thorough examination made of the horse's mouth, when you are almost certain to find some condition which would account for the slobbering. The mucous membrane of the mouth and cheeks may be scratched and inflamed from grass seeds, &c., or the horse's teeth may have sharp points on them which are similarly scratching the inside of the mouth and cheeks. All sharp points on the teeth must be filed off.

"C. E. B.," Waterloo, reports pigs weak in hindquarters, unable to walk.

Reply—See that the sties are dry, clean, and warm, and provide shelter from winds. Give the pigs from 2oz. to 4oz. of castor oil in a little milk to unload the bowels, and if necessary to get prompt action, give enemas of soap and warm water. Supplement milk feeding with food rich in salts, such as a little pollard or crushed oats, and 10gr. to 20gr. of calcium sulphate can be added to the food night and morning. Be careful always to feed regularly, and avoid overfeeding.

"G. McK.," Colton, has horse in poor condition, with large soft lump on each side of wither.

Reply—The horse is suffering from a fistulous wither, and will require to have an operation performed on him before a cure can be effected. This can only be performed by a competent man, and even in the hands of a most capable person it would require months of treatment before the complaint would be cured and healed. It would require to be opened up, from both sides probably, right down to the top of the spine which has been bruised. Unless the animal is a valuable one it would not be worth while to have him treated, because you could not do it yourself with any hope of success.

"J. M. Y.," Milang, reports litter of pigs that have developed a hard dry skin, very similar to mange. Matter is being discharged from the eyes, and the pigs are constantly rubbing themselves.

Reply—Pay particular attention to the feeding of the pigs, because you have apparently allowed their blood to get out of order in this way, with the result that they are suffering from a severe form of eczema. Avoid giving them heating food. As far as possible, provide plenty of opportunity for exercise, and feed liberally on green stuff. Internal treatment is very important to check this condition. Give them all a dose or two of Epsom salts, about 1oz. to 2oz. each. Mix this in their feed, and repeat occasionally. Also give twice daily in the feed about 5gr. (per pig) of sulphate of iron. Externally wash the pig with 1 per cent. solution of lysol in warm water to clean the body and remove scabs. Dry thoroughly, and smear them over with the following dressing:—Flower of sulphur, 1 part; raw linseed oil, 8 parts. Apply the dressing over one half of the body the first day, and over the other half the next day. Repeat every three or four days until the irritation ceases.

"L. O.," Lameroo, has eight-year-old draught gelding passing dung saturated with blood.

Reply—Your horse is hæmorrhaging from the bowels, and should be kept absoutely resting. Feed only on light easily digested food, and give him ½ dram of lead acetate twice daily dissolved in about ½ pint of cold water, to which a little vinegar has been added.

"W. R.," Giles Corner, reports cow on being milked gave congealed blood from one quarter.

Reply—It appears that an injury has occurred to the quarter affected. Bathe part with fomentations, and keep the teat entrance thoroughly clean to avoid further infection by germs, which would soon result in mastitis. Keep the free end of the teat smeared with a little boracic ointment. Milk out the quarter very gently three or four times a day so long as any blood continues to come away with the milk, which should be destroyed. The milk from the remaining quarters should be quite all right. Be very careful of injecting liquids into the udder through the teat. It is a dangerous practice.

"E. N.," Sevenhills, asks method of dealing with flies which are stinging cows.

Reply—The flies which are causing the trouble are the Stomoxys, or stinging stable fly, which in general appearance are very similar to the ordinary house fly. They are quite common during the late summer and autumn, and seasonal influences may largely account for their great prevalence this year. The larvæ live in fresh dung. They are blood suckers, and the only reason for their showing a preference for the Jersey cow over other breeds would lie in the fact

of the Jersey cow being finer and thinner skinned, so that the proboscis can more readily penetrate the hides and suck the blood. To mitigate the trouble, keep the cowshed clean and free from collections of dung as much as possible. To protect the cattle, their bodies may be dressed with weak decoctions of tobacco, aloes, or asafoetida, applied to those parts which seem most prone to attack by the flies.

"F. M. J.," Mount Bryan, reports mare foaled twins in September. Mare had to have assistance to give birth to the first foal, and the second foal was carried for an additional two and a half days. Legs were very swollen, but this has been cured by repeated bathings.

Reply—The breeding bag of your mare has become infected subsequent to the foaling, and her condition is chronic. The swelling of the legs is also a sequel of the foaling, and the recurrence of the swelling is largely due to her system becoming debilitated by absorption of poison from the breeding bag. She will require long and careful nursing if she is to do any good, and liberal feeding should be supplemented by the use of medicines. Give her the following powder twice daily for a week, spell for three or four days, and repeat:—Pulv. nux vom., 1 dram; sulphate of iron, 1 dram; pulv. rad. gentian, 2 drams. Mix this powder in a spoonful of treacle to make a stiff paste, and smear it over the tongue and back teeth with a piece of smooth flat stick. Water her, if possible, out of a bucket, and put 1oz. of hyposulphate of soda in it daily. Local treatment is necessary, and you must make sure that the solutions you use for douching are carried right into the breeding bag, and not only the back passage (this is not sufficient, for if you only wash out the back passage you are not getting at the source of the trouble). See that the end of the tubing is put right in through the neck of the breeding bag. Flush out first with warm saline solution (common salt, 1 teaspoonful; water, 1 pint). Then flush by injecting about ½ pint to 1 pint of the following:—Iodine, 1 part; potass. iod., 3 parts; water, 100 parts.

"C. W.," Wynarka, asks ration for cow that is constantly chewing rags and bones.

Reply—Add bran and 2lbs. or 3lbs. of crushed oats to the feed, and mix in it each day 1oz. of common salt and a tablespoonful of fresh ground bone meal. If possible, stop her from having access to old bones and old clothing. It will be harder to check the habit if she still has them available to her.

"M. S. L. B.," Nunjikompita, has cow with one-quarter of udder swollen and hard, and the milk is tinged with blood. The swollen quarter is cracked, and a sore has developed.

Reply.—Your cow has a bad attack of mastitis in that quarter. Keep the udder thoroughly clean, and dress the wound with mild antiseptics; syringe out the cavity. It should, with help in this way, soon heal up. If you observe every care in handling and milking her, and at all times exercise thorough cleanliness, the other quarters should not become affected, and she will still remain of value to you as a three-quarter beast.

"M. K.," Colton, asks treatment for lambs with "dry bible."

Reply—Give the sheep a purgative dose each of two packets Epsom salts dissolved in half a pint of warm water. For lambs, give one packet as a dose. Supply them with the following lick:—Powdered gentian root, 4 parts; sulphate of iron, 1 part; common salt, 2 parts; soda bicarb., 2 parts; charcoal, 2 parts. If hand fed, they can be given one tablespoonful in the food daily. This mixture should be carefully and thoroughly prepared.

"W. J. G.," Kangarilla, reports (1) sow that remains barren after repeated service, and (2) horse with thin skin, and easily contracts sore shoulders.

Reply—(1) A careful expert examination would be necessary to ascertain the cause of the sterility. It may be due to abnormal conditions of the womb or ovaries, or too fat or too lean condition. If the condition is at fault, you can remedy that by proper handling. If not due to this cause, try her with another boar, and if she misses again, send her to the butcher, because she will most likely be diseased in the genital organs. (2) *Re* horse with sore shoulders. Careful fitting of the collar is very essential, and the lining should be kept soft and clean. It can be lined with a piece of sheep skin, with the wool next to the animal's shoulders, but the same care must be taken to keep this soft and clean. It can be removed occasionally, and a fresh piece put in place of the old piece. To harden the skin, bathe it frequently with a solution of wattle bark or strong brine.

"F. H.," Bowhill, has heavy draught horse passing urine with manure.

Reply—There would appear to be a fistula between the urethra and bowel, just inside the anus. This is a very rare accident. There is nothing you can do to relieve the condition without the services of a qualified veterinary surgeon.

"E. L.," Kalangadoo, has young heifer with cow-pox on the udder.

Reply—As a rule simple kygienic precautions and cleanliness will suffice to prevent any complications from cow pox, which of itself is usually benign, and runs a more or less regular course. Clean the udder and teats thoroughly by bathing with a warm solution of boracic acid in boiled water, and dry thoroughly and gently. Apply thinly over the parts a little antiseptic ointment, *e.g.*, boracic acid, ½oz.; eucalyptus, 30 drops; vaseline, 4oz. This will act as a protective and healing agent, will prevent cracking of the teats, and render the animal more tractable for milking. Repeat the treatment regularly, wiping the udder clean and dry each time just prior to milking.

Hon. Secretary, Blackheath Agricultural Bureau, reports mare in good condition, after drinking rolls as if in great pain.

Reply—The mare is evidently subject to repeated attacks of so-called "water colic," and the remedy would seem to be one of judicious handling. Always water before feeding, take the chill off the water, and do not let her fill herself up with one long drink, but let her have a half drink, and get the balance some little time after. Let a reasonable period of about an hour at least elapse after watering and feeding before putting her to work. When knocking off work, let her spell for a while to cool down thoroughly before giving her a drink, and again only give her a half a drink at a time. Horses in work naturally get more thirsty than when at rest, and a horse out at grazing will usually visit the watering place several times a day, and drink only in small quantities at a time. When in work, they cannot visit the water trough except at long intervals, and, being more thirsty, they take too much at once, with the inevitable result that they frequently go down shortly afterwards with an attack of colic. Give her a daily ration of common salt, 1oz., mixed in the food, and put her on to a tonic powder for two or three weeks, consisting of—powdered nux vomica, 4oz.; pulv. gentian root, 8oz.; pulv. ferri. sulphate, 4oz.; fenugrek, 1lb. Two tablespoonfuls to be mixed in food twice daily, or mix dose with a spoonful of treacle to make a stiff paste, and smear on back of tongue and teeth with a smooth flat stick immediately after feeding.

POWER FARMING

The Question of the Hour.

In view of the rapidly growing interest taken by farmers in all parts of the world regarding power farming, we have compiled a list of questions generally put to us by farmers, and have added our replies thereto.

Question *Is power farming a necessity to the Australian farmer?*

Answer Let us reason it this way. These are days of keener competition. America has over produced; Russia has again entered the world's markets as a producer and exporter, and the Australian farmer, by reason of his great distance from his markets, works under an additional handicap in consequence of heavy charges for freight. The abnormal conditions which, during the war, gave prices a decided lift, do not exist to-day. For these and other reasons the Australian farmer is compelled to reduce his working expenses. Farmers in all parts of Australia tell us that the only satisfactory way he can do so is by utilising power farming machinery with the aid of CASE Tractors.

Don't fail to read the last Question.

Question *Is the Tractor a payable proposition to the small farmer?*

Answer Many instances can be mentioned, particularly in the West, that where small farmers have purchased the Tractor they have been in a position to undertake contract work—a very lucrative business. We have testimonials which proved, beyond doubt, that the advantage gained is twofold—not only has it enabled the farmers to pay for the Tractor, but has provided them with the necessary funds to keep going during the first years on the farm. To the small farmer the CASE Tractor is a valuable acquisition.

Question *America is the home of tractors, but is it not a fact that tractors are going out of favor in that country?*

Answer Read what authorities on the subject have to say. According to *Bulletin* 405 of the Agricultural Experiment Station, Cornell University, U.S.A., it states that—"Where Tractors are used, the average amount saved in hired labor per annum is equivalent to 4·1 months." Can you conceive of Tractors going out of favor when, in plain words, over one-third of the hired labor is saved?

Question *Is the CASE Tractor as good a proposition to the Australian farmer as it is to the man on the land in America, where fuel is cheap?*

Answer Experience has proved that the CASE Tractor in Australia is equally as good a proposition as in America. It must be remembered that in the latter country farmers plough deeper than here. Australia is ideally suited to Tractor farming, because of the shallow ploughing, which is the basis of most farming operations in the various States. This balances the increased cost of fuel, and puts the Australian farmer on a par, so far as costs are concerned, with the American, even though the latter has the advantage of cheaper fuel.

Question *Isn't it necessary to keep a team of horses as well as a CASE Tractor?*

Answer At first some CASE Tractor owners did keep a spare team of horses. It was not long, however, before, in many instances, they were disposed of. To-day there are numbers of CASE Tractor owners who only keep one horse on the farm, and that for use as a hack. We have testimonials to substantiate this statement.

Here's a Message from a CASE User.

Read these facts carefully.

Copy of letter from Mr. C. A. Nolan, Kununoppin, W.A.:—

"In reference to the 15/27 CASE General Purpose and Farm Tractor, which you started up for me, I must say that I am well satisfied with the Tractor and its performance.

I have ploughed forty-two (42) acres per day, working 24 hours, with two (2) five (5) furrow McKay Sunrise Ploughs, weighing 23cwts. each. The fuel consumption was just under one (1) gallon per acre, with 23in. disc, ploughing 4½in. deep, replacing six (6) teams of seven (7) horses, or forty-two horses in all; width of furrow, 6in. and the two (2) ploughs were cutting 2ft. 9in., or a total width of 5ft. 6in., working on low speed.

The ground was very hard, and it was under trying conditions.

I may state that this Tractor, working shifts with two men, has replaced six (6) men, doing 700 acres of ploughing, and 400 acres of harvesting of wheat crop. During the harvest operations, one day we started at 8.45 a.m. and finished at 7.30 p.m., altogether doing 40 acres with two (2) eight (8) feet Massey Harris Reaper Threshers. During that time one (1) hour was lost through stoppages in connection with adjustments to the harvesters.

I may mention that this 15/27 h.p. CASE Tractor is most suitable for all classes of farm work. It can take the place of horses for any implements whatsoever. I can thoroughly recommend this Tractor to anybody, and can honestly say it is far cheaper than horses, and is undoubtedly the best thing on wheels for its simplicity and durability."

Included among the innumerable unsolicited testimonials we have received from CASE Tractor users all over Australia, may possibly be the experiences of farmers who have had to contend with conditions similar to those on your farm to-day. You can get the benefit of these experiences from our Book of Testimonials, Post Free on application.

Commonwealth Agricultural Service Engineers, Ltd.

Richards Buildings, Currie Street, Adelaide.

Sole Australian Agents for CASE Power Farming Machinery.

POWER FARMING

The Question of the Hour.

Question *How many tractor owners have reverted to horses because they were better than tractors?*

Answer It is a gratifying tribute to the sturdiness and dependability of the CASE Tractor, and the manner in which it stands up to the exacting claims made for it, that we have no knowledge of any CASE Tractor owner reverting to horses. On the contrary, we have been assured again and again by our clients that their experiences of power farming machinery, with the aid of CASE Tractors, have been so satisfactory, that on no account would they return to the old arduous and costly method of farming with horses. The large number of testimonials we have dealing with this important aspect of farming make interesting reading.

Question *How many horses will a CASE Tractor displace?*

Answer The CASE Tractor does the work of 10 to 12 good horses, and, in addition, will do all stationary engine work. With the unfailing power of the CASE Tractor and CASE machinery you can make every pound your farm is capable of producing. Unfavorable conditions can be discounted, for the CASE is the farmers' crop insurance policy.

Question *Why is the CASE Tractor a good insurance policy for crops?*

Answer Australian farmers lose millions of pounds annually because they are unable to do their farming operations at the proper time. This time is limited; it cannot be exceeded without loss in quantity and quality. There is a right time for every job on the farm, generally that time is short, but the Tractor enables the farmer to take up this work in its order and complete it on time. The CASE is an insurance policy, because with it the farmer is able to do the highest quality of work within the time for best results, and, what is of equal importance, do it economically.

Question *Of course, I know all about the value of time!*

Answer But have you ever ascertained what, say, a delay at seeding time actually means? The Central Experimental Farm, Ottawa, Canada, made a series of experiments extending over a period of 10 years, and secured some interesting and startling results. The data collected proves that a delay of one week at seeding time shows a decrease of 20 per cent. in one year, whilst two weeks' delay causes a drop of 40 per cent., a delay of three and four weeks, respectively, 50 and 58 per cent. Practically the same loss appears in barley and oats. Now, work this out on the gross value of your crop. We think the result will surprise you.

Question *Where can I get further information about this labor-saving, money-making CASE Tractor?*

Answer Further information and copies of unsolicited testimonials can be obtained by dropping a line to **Commonwealth Agricultural Service Engineers, Ltd., Richards Buildings, Currie Street, Adelaide.**

Sole Australian Agents for CASE Power Farming Machinery.

Watch for further Questions and Answers in next issue.

The Quality Tractor

CASE

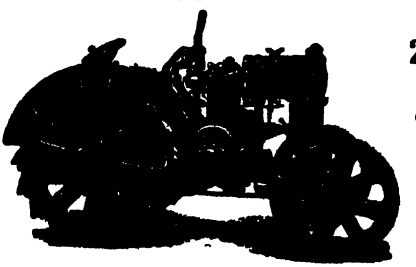
Kerosene Farm & General Purpose Tractor

MEN on the land in Australia now realise that the CASE name stands for Quality, and that the CASE Tractor will do everything the makers say it will—and more. Wherever there is ploughing, cultivating, pumping, chaffcutting and heavy road hauling to be done the CASE will prove a good investment, because it is economical and entirely satisfactory for all draw-bar and belt work. If costs are to be cut the CASE is indispensable. It is only a question of the size of Tractor required.

The CASE is supplied in Four Sizes

12/20 H.P.

15/27 H.P



22/40 H.P.

40/72 H.P.

Write us about the acreage and requirements of your farm or orchard and we will recommend a suitable-sized Tractor.

Sole Australian Agents:

Commonwealth Agricultural Service Engineers Ltd.

Head Office: **Richards Buildings, Currie Street, Adelaide, S.A.**
Box, 674, G.P.O., Adelaide. **'Phone, Cent. 6870.**

Please send me further particulars of the CASE Tractor.

Name.....

Address.....

FERTILISERS AND SOIL AMENDMENTS.

[By W. J. SPAFFORD, Superintendent of Experimental Work.]

Fertilisers are substances supplied to soils to make good any deficiency of the plant foods essential to the growth of crops, whilst soil amendments are materials used to correct any faults in the mechanical condition of a soil; and to enable one to understand the economical use of these aids to cropgrowing, some knowledge of the requirements of crops, and how they are obtained, is necessary.

FOOD REQUIREMENTS OF PLANTS.

Chemists find when they analyse plants that all of them contain:—Carbon, hydrogen, oxygen, sodium, magnesium, sulphur, chlorine, iron, silica, manganese, nitrogen, phosphorus, potassium, calcium, and although other substances are sometimes found, none of the above is ever absent, and so it is natural to consider that all of them are essential to plant growth, and with the possible exception of silica, experiments confirm this, for if any of these substances be kept from a plant it either does not grow at all, or else makes but a very weakly plant.

WHERE PLANTS GET THEIR VARIOUS FOODS.

Nearly every individual plant that grows starts from a seed, which in most cases contains but very little material in it, so that practically all the mass comprising the plant is obtained from somewhere after the very small supply of food contained in the original seed (or cutting, tuber, bulb, &c.) is used up. Now, of the materials forming the plant, the carbon (about 50 per cent. of the dry substance of plants) is obtained from the air, the hydrogen is obtained mainly from water, the oxygen (which, with the hydrogen, equals something over 40 per cent. of the dry substance of plants) is obtained mainly from water and air, and all other substances—mineral matters—are obtained by plants from the soil.

HOW PLANTS GET THEIR VARIOUS FOOD SUBSTANCES.

Carbon.—This important part of plants is obtained from the atmosphere. All of the higher animals breathe in air, of which some of the oxygen is used in the combustion of the food eaten, and carbonic acid gas is breathed out, and all combustion of organic matter containing carbon, such as fires, decompositions, &c., also gives off carbonic acid gas, and these two main sources keep up a constant and fairly regular supply of carbonic acid gas in the atmosphere. In the presence of sunlight, the green parts of plants have the power, which is fully used, of absorbing this carbonic acid gas, and retaining the carbon which it contains.

Hydrogen.—Water is a combination of hydrogen and oxygen, and is constantly passing through the growing plant, from roots to leaves, and what hydrogen is wanted by plants, other than in water, they can secure by splitting up the water.

Oxygen.—Besides getting oxygen from water and other compounds, the plants absorb free oxygen through their leaves in the absence of sunlight, and through their growing roots at all times.

Mineral Matters.—The mineral matters essential to plant growth are all secured from the soil, and, as far as is now known, the only way that these can enter the plant is in solution. The roots of plants are constantly absorbing moisture, which passes up the tissues of the plant, and most of it is evaporated from the leaves, and to our knowledge this soil moisture—other than gases—is the only substance taken up by plant roots, and so, for the mineral matters to enter the plant, they must be soluble in the soil moisture.

Mechanical Condition of the Soil.—The soil supplies the water, some oxygen, and the mineral matters to plants, and as most plants are fixed into soil, it must be in such a mechanical state that water and air enter it easily, and the roots of plants can readily penetrate it in search of their requirements.

MANURING.

As we have no control over the supply of carbon to plants, and but very little over the hydrogen and oxygen, manuring may be defined as "making good any deficiency of mineral plant foods." But analyses of soil and field results have both shown that, with comparatively few exceptions, all soils are supplied with sufficient of most of the mineral matters required by crops to last for hundreds, and perhaps thousands, of years, and that they are only likely to be deficient in nitrogen, potash, phosphoric acid, and, in some cases, lime. This being so, for all practical purposes we can reduce our definition of manuring to "making good any deficiency of nitrogen, potash, phosphoric acid, or lime."

INFLUENCES OF THE VARIOUS FERTILISERS.

Although it is usually necessary to apply fertilisers which supply nitrogen, potash, phosphoric acid, and lime, if good results are to be secured for a long period of time, where intense culture is being practised, such as in market gardening, "home" gardens, and in "mixed" farming, some knowledge of the influences of each one of the principal commercial fertilisers is essential to ensure that it will be economically used for the different types of plants being cultivated.

NITROGEN.

Nitrogen is the plant food which encourages luxuriant growth in plants, and as such it must be present in adequate quantity for plants from which much leaf development is expected. The lack of nitrogen is often evidenced by poor, stunted growth, scanty foliage, and a general sickly yellow appearance, whereas an excess of nitrogen in the soil tends to increase the susceptibility of plants to disease. Nitrogen must be in combination before plants can use it, and as far as we know it must be combined up as a nitrate, otherwise it cannot be utilised. The soil bacteria, when properly encouraged, quickly convert other salts containing nitrogen into nitrates, particularly the ammonia salts, and slowly convert the nitrogen in organic matter, so

as to be available to plants. By providing a full supply of organic matter, and encouraging the activities of the soil bacteria, applications of nitrogenous manures can be done without. The common forms of fertilisers supplying nitrogen are:—

Nitrate of Soda.—This is ready for the use of plants as applied, so is a very quick-acting form of nitrogenous fertiliser, and as such is very suitable for use in cold, wet soils, where the bacteria are not very active. In heavy soils nitrate of soda has a bad effect on their mechanical condition by deflocculating the soil particles, thus making them very sticky; but this disadvantage can be overcome by using a mixture of half and half nitrate of soda and sulphate of ammonia, which should be applied as soon as mixed. Nitrate of soda is readily washed out of the soil, so should only be applied as a top-dressing after the plants have germinated. Owing to its quick action, an application to plants that have been checked in their early stages will almost invariably enable them to recover very rapidly. Applied to heavy land, it liberates potash for the use of plants.

Nitrate of Lime is quite equal to nitrate of soda as a fertiliser, providing that the same amount of nitrogen is applied, and has no ill-effect on the condition of the soil.

Sulphate of Ammonia.—This substance is next to the nitrates in regard to the quickness with which it acts, and although it has to be converted to nitrate before becoming available, it does not take a long time when conditions are favorable. Sulphate of ammonia has no bad effects on soil conditions, except to reduce the lime content, and leads to excessive acidity in those soils not naturally well supplied with lime. This substance is not leached out of the soil very readily until converted to nitrate.

Potash.

Potash appears to have special effect in encouraging the formation of the carbo-hydrates—sugars, starch, oils, &c.—and in promoting the growth of leguminous plants. As such, potash is a very important fertiliser for intense culture, because all the "root" plants, such as potatoes, onions, artichokes, dahlias, anemones, &c.; all the leguminous plants; all the fruits, especially the sweet ones; and all the nuts are particularly benefited by a plentiful supply of it. Potash also encourages extra vigor in plants, strengthens their stems, and tends to make them more resistant to diseases. Light, sandy soils contain but little potash, so applications of this fertiliser are quite essential if much growth is wanted. Heavy-textured lands, on the other hand, are usually rich in potash, and applications of nitrate of soda generally liberate enough potash for full plant growth. The appearance of red coloring along stem and leaves on plants that should be green, and when the points of the leaves tend to die back, as a rule denote an absence of sufficient potash in the soil. Where potash is difficult to obtain, applications of salt, lime, gypsum, or nitrate of soda liberate this substance from soils. Potassic fertilisers have a bad effect on the texture of soils by deflocculation of soil particles, due to the formation of potassium carbonate. All potassic fertilisers delay the germination of seeds, and retard the early growth of plants; so they should be applied to the soil about one month before seed is sown.

Muriate of Potash.—Muriate of potash is one of the principal forms of potassic fertiliser sold in this State, and originally only came from the Stassfurt mines in Germany, but is now being received from the French mines of Alsace as well. This fertiliser is the most concentrated form in which potash is applied, and in normal times is cheaper per unit than are the other forms. In appearance it looks like dirty, coarse, common salt of a yellowish color, and as such can be easily handled, and will mix well with the other common forms of fertilisers. It has a tendency to deplete the lime content of the soil, so should only be applied where plenty of lime is present. Muriate of potash can be used for all plants except the likes of tobacco, potatoes, onions, etc., where the chlorine which it contains is likely to injure the quality. This form of fertiliser should not be used on soils already over-supplied with chlorides, such as are many in low-rainfall districts.

Sulphate of Potash.—This form of potassic fertiliser is usually dearer per unit of potash than is the muriate of potash, but it can be used with safety for all plants, and also on soils rather low in lime content.

Kainit or Sylvinite.—Kainit, like the two previous potassic fertilisers, is also obtained from the Stassfurt mines, and is the most common product of those mines, whilst sylvinite is got in Alsace. It is a mixture of a number of salts, but mainly common salt and sulphate of potash, and is essentially a low-grade potassic fertiliser, taking three to four tons of this to supply as much potash as will one ton of muriate of potash. As it contains a lot of chlorides, the same restrictions to its use as for muriate of potash also apply. Further, it has to be applied to the soil so that it does not come in contact with the seed, because it seriously affects the germination of them. It is specially suitable to crops that originated near the sea, such as beets, asparagus, &c.

Phosphoric Acid.

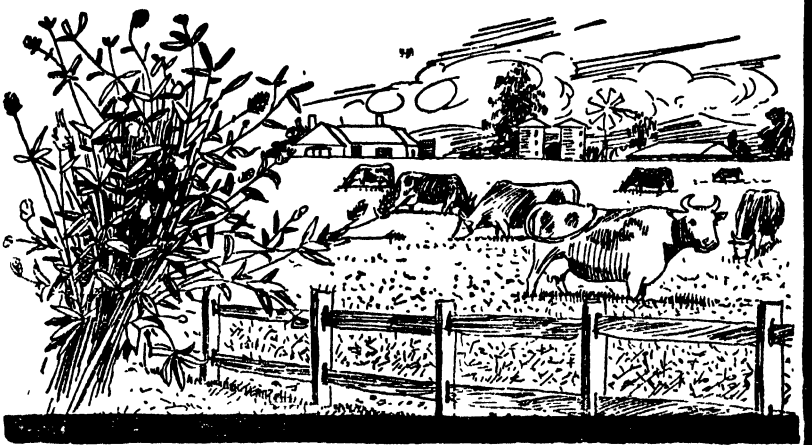
But few soils of the world contain much phosphoric acid, and Australian soils are notably deficient in this plant food and where intense culture is practised the supply of this substance is soon used up, and in consequence the making good of the shortage of phosphoric acid by applications of phosphatic fertilisers is found to be necessary fairly soon after the cropping of most soils has been regularly undertaken. A full supply of phosphoric acid in the soil plays a special part by stimulating early root development and promoting general vigor to plants in the early stages of growth, by tending to counteract any tendency to rankness, by promoting early maturity, and by tending to the development of flowers and seed rather than leaf and stem. Phosphoric acid is commonly found in the world in combination with lime, and it is usually as a form of calcium phosphate that it is used as a fertiliser, the well-known kinds being:—

Bonedust.—This consists of the ground bones of animals, and as the calcium phosphate in bones is in an insoluble form, this fertiliser must be finely ground if plants are to get much of the phosphoric acid in the year that it is supplied, and, failing this fine state of subdivision, it is but slowly available. Experience has shown that finely-ground steamed bones and bone flour are good phosphatic manures for light

The Variety of Proven Merit—

Brunning's Genuine "MESGAWI"

BERSEEM CLOVER



CAN BE PASTURED, CUT FOR GREEN FEED, OR MADE INTO HAY.

Berseem Clover is the finest of all the Winter Fodders, and the Heaviest Yielder. Grows in Winter like Lucerne in Summer.

MORE REASONS FOR SOWING "MESGAWI" BERSEEM CLOVER.

1. Cleanses the land, as the cutting destroys the weeds.
2. Can be ploughed in for green manure.
3. Adds nitrogen and humus to the soil.
4. Unequalled as a predecessor to Lucerne.
5. Will average from 4 to 5 cuttings in one season.
6. Has yielded nine cuttings in the one season.
7. A splendid Winter Fodder for dairy cows, and does not taint milk.
8. Does not cause bloat.

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soils poor in lime, such as sands and gravels, where much water is not used. Although bone products are good phosphatic manures, the user generally pays very dearly for his fertiliser, because the price per unit of fertilising material is much higher than can be obtained in other forms of phosphatic manures. The demand for ground bone is always greater than the supply, and appears to be caused by the prejudice in favor of this form of fertiliser, which has been handed down for ages by crop growers. For a very long period of time, and until comparatively recently, bones in some form were one of the few forms of manure used by crop growers which gave them big increases in yields, and despite the increased knowledge of plant requirements, and the discovery of fertilisers to supply the deficiencies of plant food, many users of phosphatic manures still pin their faith on bonedust, no matter what price they have to pay for it.

Basic Slag.—Basic slag is obtained in the manufacture of steel from iron containing phosphorus, by combining up this phosphorus with lime, after it has been removed from the iron. The slag obtained, to make a good fertiliser, must be so finely ground that at least four-fifths of it will pass through a sieve having 100 meshes to the inch, and, when so ground, this fertiliser is a very good form in which to apply phosphoric acid to heavy clayey soils where there is a good rainfall, or where irrigation water is applied. This fertiliser is not nearly so soluble as is superphosphate, but it contains a high percentage of free lime, making it very useful for some conditions. Unfortunately, in South Australia, much use cannot economically be made of this form of fertiliser, owing to the high price asked for it. In England it is found to be worth per unit of calcium phosphate, about the same as the unit of calcium phosphate in superphosphate; but where special circumstances call for the use of basic slag to supply the phosphoric acid necessary, the value of the fertiliser naturally increases above the comparative value mentioned.

Superphosphate.—This is manufactured by treating insoluble calcium phosphates (either mineral or organic) with sulphuric acid, when the great bulk of the insoluble phosphate is made soluble in water. On practically all normal soils superphosphate is the most effective phosphatic fertiliser when equal amounts of phosphoric acid are compared, but for the full benefit to be received from applications of this fertiliser, the soil should contain an excess of lime (calcium carbonate), so that the free phosphatic acid which it contains combines with the lime; where sufficient lime is not present, the phosphoric acid combines with iron or aluminium, forming in some cases unavailable phosphates, and so much of the phosphoric acid may be lost to the plants which it is proposed to benefit. The soils in which applications of superphosphate do not give the full beneficial effect are light sands and gravels deficient in lime, peaty soils containing sour humus, and sour soils generally. The effectiveness of this form of phosphatic fertiliser seems to be due to the fact that, owing to its solubility when it is put in the soil, even though it reverts very quickly, it is deposited in a very fine state of division throughout the soil in the neighborhood of the roots of the plants. Superphosphate has a wonderful effect in promoting rapid root development, and so is especially valuable to

shallow-rooted plants, and short-lived crops which have to grow quickly. For the same reason it is very useful as an application in the early spring, to plants which have been badly checked in the winter, to give them a good quick start again.

Raw Rock Phosphate.—Deposits are found in various parts of the world containing phosphoric acid in large quantity, combined up mainly with calcium and to lesser extent with aluminium, and it is from the former—calcium phosphate—that the great bulk of the superphosphate is manufactured. Until comparatively recently but little of these mineral phosphates were used as fertilisers without treatment to change the form of phosphate, and the results secured when untreated phosphates (raw rock phosphates) were used, in most cases were poor; but it is now known that, providing the calcium phosphate is very finely ground, it makes a really good phosphatic manure for certain conditions. It is a matter of common knowledge that the use of superphosphate on sour soils does not reduce their acidity, and it is here that finely ground raw calcium phosphate is a suitable phosphatic fertiliser. As a general rule, it can be taken that finely ground raw rock phosphate can be used to advantage in sour soils, in peaty soils, where the rainfall is heavy, and where irrigation is practised. To make its use economical, it should be so finely ground that at least 60 per cent. is able to pass through a sieve with 100 meshes to the inch. Where nitrogen as well as phosphoric acid is to be applied, sulphate of ammonia and finely ground raw rock phosphate make a good mixture for the purpose, and the interaction between the two materials liberates the phosphoric acid more quickly than would otherwise be the case.

On the results being secured at Kybybolite Experimental Farm, it appears that finely ground aluminium phosphate is quite equal to finely ground calcium phosphate, at all events for top dressing pastures.

Lime.

Lime is so seldom absent from a soil, to the extent that plants cannot get enough for their proper growth, that it is hardly worth considering as a direct fertiliser. In some few cases, where organic manures are the only ones available, light applications of lime increase the growth of plants as the result of the plants being able to get their lime easily; but as these cases are so rare, and as lime is extremely important as an indirect fertiliser, it will be considered later under that heading.

COMPOUND FERTILISERS.

Of the common fertilisers providing more than one of the essential plant foods, the main ones are organic manures, and of them the following are the most important:—

Farmyard Manure.

This consists of the solid and liquid excrements, together with the bedding or litter provided, of the domesticated animals. On large holdings, where a lot of animals are kept, this consists

of a mixture of the droppings of different kinds of animals, but it often happens that the manure available is derived from only one class of animal, and is very often excreta only, without litter of any kind. Farmyard manure has the experience of ages in its favor, and by many is considered the all-in-all as regards manures, and although its direct benefit as a carrier of plant food is not so very wonderful, its indirect value makes it the most important of the manures. Although farmyard manure consists of plants, and contains the bulk of the substances originally in the plants, but in changed forms, still, when being applied as a fertiliser, it does not contain nearly as much of any of the principal plant foods as are required, nor are they in the correct proportions for plants, nor do they all become available with equal rapidity. One ton of farmyard manure contains about 12lbs. to 17lbs. nitrogen, 5lbs. to 9lbs. phosphoric acid, and 13lbs. to 15lbs. potash, of which the nitrogen and phosphoric acid are but slowly available, and for most crops it is found necessary, even when liberal applications of this manure are given, to reinforce it with nitrogenous and phosphatic fertilisers. It is quite a common practice in small gardens to use farmyard manure as a mulch, but unless the manure was well rotted before being used for such a purpose, it must be recognised that with such treatment the loss of nitrogen—the most expensive plant food that has to be supplied by growers—is fairly considerable. Farmyard manure should be put *in* the soil; any bulky organic matter, such as straw or the plants pulled from the garden, will make just as good a mulch as will the manure. Farmyard manure, in all of its various forms, has a very marked beneficial effect as a soil amendment, and as an indirect fertiliser; but this phase of its activities will be dealt with later on.

Horse Manure.—Horse manure is comparatively dry, and as such decomposes very rapidly, and so is more suited than are the wetter manures, to use in cold, wet soils. In its rapid decomposition much heat is given off, and so it is a good form of farmyard manure to use in hot beds and to force the growth of plants. To prevent loss by over decomposition, the heap of horse manure should be pressed together as much as is possible, and not allowed to become dry.

Cattle Manure.—This manure is wet and dense, and so decomposes slowly without the development of noticeable heat, and as such is a suitable manure to use on light sandy soils, and it can be depended on to have a lasting effect.

Pig Manure.—Pig manure is very similar to cattle manure in being moist, of slow decomposition, and in being suitable for light sandy soils. It is usually much richer than is the former, however, and so more valuable.

Sheep Manure.—This being dry, is, like horse manure, very easily decomposed, with the generation of much heat, and fills the same bill as does the horse manure, but is a much richer fertiliser, and is exceptionally well suited for the forcing of plants.

Bird Manure.—The droppings of the domesticated birds, particularly those of pigeons and fowls, are really well supplied with fertilising elements, and are suitable for application to all plants needing forcing.

Guano.

Guano consists of the partly decomposed droppings of birds, and in some few places has accumulated into huge deposits, which, in hot, dry places, have retained most of the original fertilising value of the droppings; it then is an extremely rich fertiliser. Unfortunately, nearly all of the deposits of good guano have been worked out, and the most of this material now put on the market is obtained from places where much of the nitrogen has been leached out, and the bulk of them are essentially phosphatic fertilisers, containing only a small percentage of nitrogen. Guano is a loose dry powder of a grey color in rich samples, becoming browner as the nitrogen contents get lower, and has a characteristic odor of ammonia. It is usually friable, and easy to distribute. A good guano is naturally a well-balanced manure, and the nitrogen is present in different forms, which take varying periods to become available, and so it is a safe manure to use for all crops, because it does not tend to over-stimulate plants in the same manner as do some active nitrogenous fertilisers. When obtainable at a reasonable price, a good guano is a most suitable manure for orchards and gardens, and for intense culture generally, particularly for use by individuals not thoroughly understanding manures and manuring.

Green Manuring.

Where the mechanical condition of the land is bad, or where the land is of low fertility, the putting into the soil of a bulky green crop of some kind is of great benefit. Whatever kind of crop is grown as a green manure, it must be turned under the soil at flowering time; if left longer, it becomes too woody, and the decomposition of it is delayed. Where nitrogen is lacking, a leguminous crop, such as peas, vetches, lupins, clover, &c., makes the best green manure crop, but where it is lack of organic matter and general poverty, any bulky crop that will decompose quickly serves the purpose.

Dried Blood.

Dried blood is almost essentially a nitrogenous manure, but it always contains some phosphoric acid. Originating as it does from slaughter-houses, dried blood frequently contains other substances, and so is not always of uniform composition, necessitating great care when purchasing it. It should contain from 9 to 14 per cent. of nitrogen, and as it undergoes fermentation very readily in the soil, it is one of the most valuable of organic manures, particularly as about 96 per cent. of its total nitrogen is available to plants in the year of application.

SOIL AMENDMENTS AND INDIRECT FERTILISERS.

Besides the materials already discussed, all of which are direct fertilisers, there are others which improve the soil texture, and liberate plant foods from unavailable forms, and as such are known as soil amendments or indirect fertilisers. The principal ones of these are farmyard manure, lime, gypsum, and salt.

Farmyard Manure as a Soil Amendment.

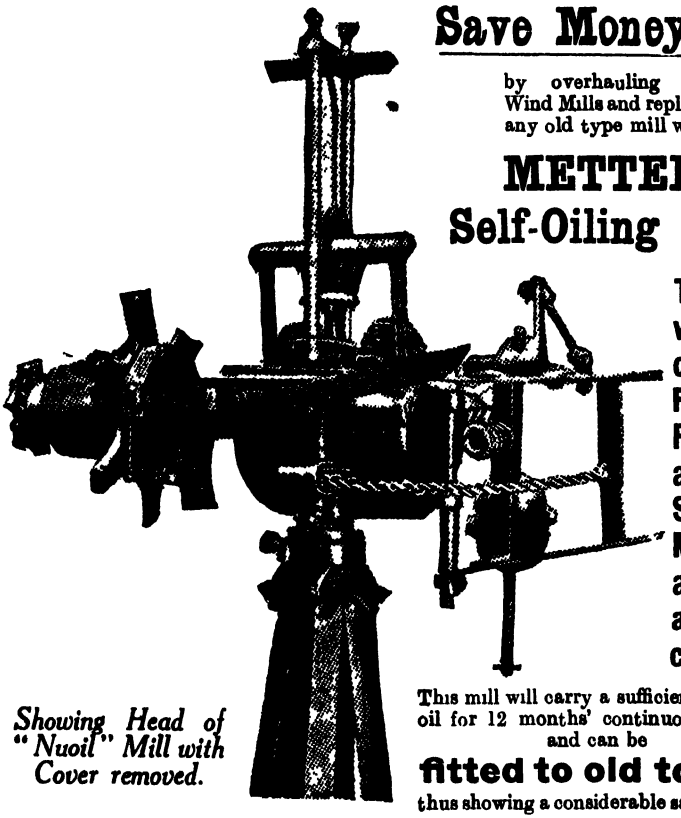
It has already been pointed out that farmyard manure is a very valuable direct fertiliser, but at the same time it is a very important material, in common with most bulky vegetable matter, for the amelioration of unfavorable mechanical conditions of soils, and in acting as an indirect fertiliser.

The value of farmyard manure in this direction is mainly due to the facts that (1) it improves the texture of all soils, by loosening heavy soils and making them more friable and open, and by more or less loosely binding light sandy soils; (2) most soils are improved by additions of organic matter in that their water absorbing and retaining powers are increased, and they are enabled to resist droughts or dry spells much better than are soils lacking in organic matter; (3) its decomposition in the soil increases the warmth of the soil, thus helping germination and growth generally, particularly in cold locations; (4) its decomposition in the soil leads to the liberation of other plant foods from their combinations with other substances; (5) the large quantity of carbonic acid gas liberated during its decomposition very considerably increases the solvent power of the soil moisture; (6) the addition of farmyard manure increases the activities of the useful soil bacteria; and (7) applications to those bare patches which appear when excess of sodium chloride reaches a dangerous degree of concentration tend to control this trouble.

Lime.

Lime is not only an essential plant food, but has a very marked effect on the mechanical condition of soils, and on the liberation of other plant foods from their unavailable combinations. When present in soils in large quantities, lower percentages of potash, phosphoric acid, and nitrogen are adequate for maximum growth, so that an application of lime, even when the soil is not deficient in this substance, to some extent does away with the need of applications of other fertilisers. The mechanical effect of lime on the soil is (*a*) to loosen heavy clayey soils by flocculating the particles, thus creating an artificial coarseness of texture, and (*b*) to some extent it tends to make loose sandy soil somewhat firmer, by acting as a weak cementing agent. Its effect on fertility is largely due to (1) its power of neutralising the acids formed in the soil; (2) its help in keeping up the warmth and moisture of the soil, so aiding bacterial action; (3) combining with the nitric acid formed by nitrifying bacteria; (4) encouraging the activities of all the nitrogen gathering bacteria, including the root-bacteria of the legumes; (5) the direct and indirect liberation of plant foods, mainly potash and phosphoric acid; (6) the rapid conversion of organic matter to humus, and the retention of the nitrogen in this humus; (7) its power of counteracting the injurious effects on plants of excesses of many of the soluble salts; and (8) its tendency to keep in check some of the plant diseases. As lime tends to sink rather quickly in the soil, it should always be applied directly on the surface, and be only worked into the surface soil, and for the same reason lime should be supplied frequently in small doses rather than in large doses once every few years, as was the practice in the past. A small dose every year, rather than heavy ones occasionally, is

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very necessary where quicklime is used, because a big excess of quicklime has a temporary ill effect on the useful soil bacteria that should be encouraged. As the quicklime applied to soils is very quickly converted to calcium carbonate, it must be this latter substance that does the work in the soil, and experience has now shown that this is so; but to get results from calcium carbonate (limestone, chalk, marble, &c.) equal to those from quicklime, it is quite necessary to have it ground very finely, and then the choice between the two is only a matter of price. A comparison between values of limestone and lime can be arrived at by reckoning that for soil dressings 1 ton of finely ground limestone is equal in value to 12cwts. of the quicklime made from similar limestone.

Gypsum.

Sulphate of lime, or land plaster, benefits some plants to a remarkable degree, especially the legumes and such plants that are dependent on potash. Although this has been known for a long time, no explanation could be given, but it now appears to be wholly due to the liberation of potash in the soil, and analyses of leguminous plants grown with and without applications of gypsum always show but slight differences in the percentages of lime and phosphoric acid, but a very great increase in the potash content of the plants grown on the treated land. Besides liberating potash, gypsum aids in the decomposition of organic matter, and absorbs and retains volatile ammonium compounds. Like all other indirect fertilisers, gypsum should be applied in small doses often, rather than in big doses at long periods, because in the latter case it will possibly liberate more plant food than is necessary, and great losses may occur by leaching.

Salt

In some places the use of salt, either alone or in admixture with fertilisers, is a common practice, and is usually applied to those plants that are supposed to have originated near the sea shore. Salt liberates potash, and, providing the rainfall is heavy enough, or irrigation is practised, applications of it benefit all plants needing much potash. It should never be used unless the water supply is good, because a concentration of this substance at the surface ruins the mechanical condition of the soil, and prevents seeds from germinating there.

"COMPLETE" MANURES.

A "complete" manure is generally recognised as one containing all three fertilising materials—nitrogen, potash, and phosphoric acid—in proportions to suit the crop to which it has to be supplied. As all classes of plants require different proportions of the various plant-foods, to get ideal results with the use of "complete" manures, a different mixture would have to be used for each class; but this is not a practical proceeding, and so these mixtures are made somewhere near what are the average requirements of plants, and then for special

cases additions are made of the extra plant foods required. The composition of various brands of "complete" manures vary considerably, but they usually contain:—

From 2½ to 5 per cent. of nitrogen,
From 8 to 15 per cent. of phosphoric acid,
From 2 to 7 per cent. of potash;

and then for special conditions either more nitrogen, potash, or phosphoric acid must be added to the soil.

QUANTITIES OF FERTILISERS TO APPLY.

It is impossible to state definitely what quantity of any given fertiliser should be applied to a particular crop, because the amount required will depend very largely on the fertility of the soil, on the climatic conditions of the district, and on the system of cropping being practised. Most of the cultivated crops are habitually grown on soils of many different types, which on analyses and on cropping results show various degrees of fertility, and soils belonging to the one class vary in their powers of recuperation. The climatic conditions obtaining affect the potential capabilities of soils, and with any given type of soil it would not be economically correct practice to use equally heavy dressings of fertilisers where these soils are situated in unfavorable climatic conditions, as where the natural conditions are conducive to good growth. The system of cropping being followed plays a large part in the quantity of fertiliser applied to the various crops, because in a rotation of crops, which includes a number of different classes of plants, it is often good practice to manure one crop heavily for the benefit of the succeeding crop, and the type of crop preceding the one to be considered will also affect the manuring.

FERTILISERS FOR INTENSE CULTURE.

For manuring when intense culture is being practised, such as in market gardens and many "home" gardens, where the whole land is covered with plants (many of which make very strong growth), and where the land carries a heavy growth of plants most of the year, it must be remembered that, if the fertility of such land is to be kept up so that these big crops can be carried for a long period of time, at least as much plant food must be put back into the soil as is taken out by the plants. To be able to do this, some idea must be gained of the amounts which plants remove of those foods likely to become deficient in most soils, and in this connection the following figures can be taken as the approximate average amounts taken by an assortment of ordinary garden plants:—

Nitrogen—About 50lbs. per acre, or 2½ drams per square yard
Phosphoric Acid—About 20lbs. per acre, or 1 dram per square yard
Potash—About 50lbs. per acre, or 2½ drams per square yard.

Some of the plants commonly grown take much more of all of the plant foods than the above figures; others, of course, much less; but if these quantities are taken as a minimum, and are replaced each planting, sufficient plant food will be in the soil to produce good growth for a very long period of time. Of the common forms of

fertilisers obtainable at present, and safe to use in average conditions, the amounts necessary to replace the removals will be:—

250lbs. sulphate of ammonia (20 per cent.) per acre, or 13 drams per square yard.

121lbs. superphosphate (36 per cent.) per acre, or 6½ drams per square yard.

96lbs. muriate of potash (52 per cent.) per acre, or 5 drams per square yard.

And, because of the fact that in most cases where such very intense culture is practised, the areas utilised are comparatively small, it is perhaps well to know that:—

One teaspoonful of most fertilisers equals about ½oz., or 8 drams.

One dessertspoonful of most fertilisers equals about 1oz., or 16 drams.

One tablespoonful of most fertilisers equals about 2ozs., or 32 drams.

To be able to put on the land a manure containing the three fertilising materials, will naturally simplify the operation, and it can be done, but it must always be remembered that most nitrogenous fertilisers are very liable to be washed out of the soil, and so best results are usually obtained by adding the other two ingredients and some of the nitrogen in a mixture, and then make up the necessary amount of nitrogen in two or three extra applications during the growth of the plants. Again, in all soils, except light sands, it is rarely necessary to make good all of the potash taken out of the soils by plants, because most Australian soils are well supplied with potash, but it is only slowly available, and there is usually too little of this substance liberated in one year to make good all taken out of the ground, and so it remains necessary to add some potash. For most plants the following mixture—

Superphosphate (36 per cent.), 2 parts,
Sulphate of ammonia (20 per cent.), 1 part,
Muriate of potash (52 per cent.), 1 part,

applied at the rates of 300lbs. per acre, or 1 oz. (2 teaspoonsful) to the square yard every planting, will give good results on all soils well supplied with lime and organic matter, providing that sulphate of ammonia is applied at the rate of ½cwt. per acre, or 3 drams (about ½ teaspoonful) to the square yard, twice during the growth of the plants.

To insure success where very heavy and varied cropping is practised (market gardens, "home" gardens, &c.), the following additions should be made to average soils, with extra of some of the fertilisers for special purposes:—

10 tons to 20 tons per acre of well-rotted farmyard manure every second year, or 5lbs. to 10lbs. per square yard.

5cwts. lime per acre every second year, or 2oz. per square yard.

Phosphatic fertiliser containing about 70 lbs. of phosphoric acid per acre annually, as is contained in 2cwt. superphosphate (45 per cent.), equalling about 3 drams of phosphoric acid per square yard, or 12 drams of superphosphate (45 per cent.).

Potassic fertiliser containing about 78lbs. of potash per acre annually, as is contained in 150lbs. muriate of potash (52 per cent.), equalling about 4 drams of potash per square yard, or 8 drams of muriate of potash (52 per cent.).

Nitrogenous fertiliser containing about 45lbs. of nitrogen per acre annually, as is contained in 2cwts. sulphate of ammonia (20 per cent.), equalling about 2½ drams of potash per square yard, or 12 drams of sulphate of ammonia (20 per cent.).

In soils of heavy texture the amount of lime used should be increased, whilst the application of potassic fertiliser can be reduced, and some of the phosphoric acid can be supplied in raw rock phosphate. Smaller dressings of lime can be used in light, sandy soils, but the amount of potash should be increased, and in some cases the nitrogenous manures used should be greater, and bonedust at a reasonable price can replace some superphosphate. In calcareous soils the quantity of lime can be considerably reduced, and an increase in the amount of potash is often advantageous. In peaty soils the farmyard manure can be omitted, the dressing of lime and potash increased, and the nitrogen reduced.

MANURING OF CEREALS.

The cereals commonly grown in Australia—wheat, oats, and barley—do not remove large quantities of mineral matters from the soil, when compared to many other types of crops, and of the three important substances, they utilise more nitrogen than potash or phosphoric acid, yet in the vast majority of places where these crops are grown, we have not yet found it necessary to fertilise the cereals with anything other than phosphates. Owing to the comparative "newness" of our soils, and because of the fact that much nitrogen is collected from the air by bacteria in the soil, during the process of fallowing the land, we have not yet been able to secure sufficient profits to be worth consideration, from applications of nitrogenous fertilisers to the cereals grown on fallowed land, and the vast majority of our crops are grown with this soil preparation. Australian soils are, on the average, notably rich in potash, and dressings of manures containing this plant food are usually quite unprofitable. Neither nitrogen nor potash being necessary additions to our cereal crops to enable farmers to secure adequate profits, in most cases it only remains to add phosphoric acid, and this has now become the general practice of the country, and as most of the soils on which cereal growing is the recognised crop-producing activity are normal for mineral plant foods other than phosphoric acid, superphosphate naturally gives best results of all phosphatic fertilisers. In the cereal-growing districts, which have been settled long enough to enable farmers to clear the land of stumps and stones, applications of from ¾cwt. to 1cwt. superphosphate (36 per cent.) per acre are the rule, but because of the

fact that a 20-bushel crop of wheat, and its equivalent of oats and barley, will utilise all of the phosphoric acid supplied in 1cwt. superphosphate (36 per cent.), this should be considered as the minimum application of phosphatic fertiliser. If the fertility of the land is to be maintained, even for a limited period of time, at least 1cwt. superphosphate (36 per cent.) per acre should be used with every cereal crop grown, but if this fertility is to be increased under the more diversified farming system of "cereals and livestock," which inevitably follows the system of "bare fallow-wheat-bare fallow-wheat" common in districts whilst the scrub is being controlled, more than this minimum must be provided, and the extra amount used must be sufficient to more than compensate the quantity of phosphoric acid removed by the pasture plants following the cereal crops, and eaten off by livestock.

In a general way it may be advised, that all cereal crops grown on average soils should be dressed with at least the equivalent of 1cwt. superphosphate (36 per cent.) per acre, and when any cereal crop is to be followed by pasture, or another crop not to be manured, the dressing of superphosphate should be increased to 2cwts. per acre.

In districts where rotations such as (*a*) bare fallow—wheat—pasture, or (*b*) bare fallow—wheat—oats, or (*c*) bare fallow—wheat—barley, or (*d*) bare fallow—wheat—oats (barley)—pasture are practised, it appears at present that it will be a long time before any other fertiliser but superphosphate will be necessary, and that when additions are required, they will possibly be applications of ½cwt. nitrate of soda or sulphate of ammonia to the second cereal crop.

Where rotations such as peas—wheat—oats (barley)—potatoes are practised, particularly when the potato crop receives farmyard manure, no fertilisers except phosphates are at present required by the cereals, but where simple rotations like peas—wheat—oats are the rule, some nitrogen given to the second cereal is advantageous.

MANURIAL DRESSINGS FOR LEGUMINOUS CROPS.

Well-grown leguminous crops, such as lucerne, peas, clovers, beans, etc., collect more of the mineral matters from the soil than do the cereals; still, in most places where these crops are successfully grown in Australia, to date it has only been necessary to add phosphatic fertilisers to them. The requirements of these crops of potash and lime are great, although in most places applications of potassic fertilisers have not proved profitable, but additions of lime are usually beneficial in the districts where peas, clovers, and beans can be successfully grown under natural conditions.

Lucerne only grows really well where the soils are well provided with lime, and then only requires the addition of the equivalent of 2cwts. superphosphate per acre per year to give heavy returns. When being grown in soils rather deficient in lime, as are most of our soils in districts receiving more than 20in. average rainfall, a dressing of 2 tons of slaked lime per acre should be applied before seeding the crop, and an application of from 10cwts to 1 ton be given every four years.

Most of the other leguminous crops are usually grown in those districts receiving an average annual rainfall of from 20in. upwards, and so are usually improved by dressings of lime as well as phosphatic fertilisers, and the addition of 10cwts. lime per acre once every four years to the rotation in which the legumes are grown, as well as from 1½cwts. to 2cwts. superphosphate per acre with the leguminous crop, will at present give very profitable crops.

FERTILISING ROOT CROPS.

The root crops, including such crops as cabbages, kale, silver beet, etc., are greedy feeders, as is to be expected from the great bulk of growth made, and they remove much mineral matter from the soil.

Where at all possible, applications of farmyard manure should be made to land which is to carry a root crop, and if this is supplemented by fairly heavy applications of fertilisers carrying mineral matters, very large crops can be secured. If a dressing of 20 tons farmyard manure per acre is given to the land before seeding to a root crop, 2cwts. superphosphate per acre, and 1cwt. nitrate of soda should suffice, but failing the farmyard manure, at least 10cwts. lime per acre should be applied once every four years to the rotation, and the root crop should receive 3cwts to 4cwts. superphosphate, and 1½cwts. of a nitrogenous fertiliser per acre. Failing this form of manuring, the crop should receive 7cwts. to 8cwts. of superphosphate per acre. In some manurial experiments on potatoes, grown in a rotation, which received 10cwts. lime per acre once in four years, which were conducted for some years at Mount Barker, South Australia, the plots receiving (*a*) 8cwts. superphosphate per acre, and (*b*) 4cwts. superphosphates and 2cwts. dried blood per acre, gave about equal profits for the manuring, and these were much higher than for any other form of manuring.

MANURES FOR OTHER SUMMER CROPS.

The summer crops making very rapid growth in the hot part of the year, such as maize, sorghum, millet, sunflowers, etc., require really fertile soils, or the application of active forms of the various fertilisers, if they are to make the luxuriant growth of which most of them are capable.

When grown for forage purposes, the rotation of which one of these crops forms a part should receive an application of farmyard manure at the rate of 20 tons per acre once in four years or so, applied in preparing the land for the summer crop, and at the time of seeding a dressing of 2cwts. to 3cwts. superphosphate per acre should also be given. When insufficient farmyard manure is available, a nitrogenous fertiliser should be used as well as the phosphate, such as 1cwt. to 1½cwt. of nitrate of soda or sulphate of ammonia.

When grown for grain, the same luxuriance of growth is not required, still some farmyard manure is helpful, but in most fairly fertile soils, a dressing of 2cwts. to 3cwts. per acre of superphosphate will be all that is required, providing that the one type of crop is not grown too often on a given block of land.

In heavy clayey soils, and in those that are peaty, applications of lime aid these crops to a great extent, and such lands should receive a 10cwts. dressing once in four years.

MANURING PASTURES.

In those countries where pasture lands are well cared for, and where much work has been done in manuring experiments, it is becoming recognised that the manuring of pastures is a much simpler operation than was considered necessary until fairly recently, and for the majority of cases it can be stated that the manuring of pastures consists in supplying phosphoric acid, and in some few cases, lime. A good growth of pasture plants, whether in sown or "natural" pasture, will utilise all of the phosphoric acid available in a dressing of 1cwt. superphosphate per acre, so all pasture lands should receive the equivalent of at least 1cwt. superphosphate per acre per year. It is a proved fact in the handling of pastures, that more economical results are secured from the use of fertilisers if heavy applications are given seldom, rather than light applications often, and this is particularly so in Australia where most of our soils are rather deficient in phosphoric acid. At present prices of phosphatic fertilisers it is much more economical to apply a mixture of 1cwt. superphosphate (45 per cent.) and 10cwts. raw rock phosphate (82 per cent.) per acre once every 12 years to 15 years, rather than to annually distribute 1cwt. superphosphate per acre, and the grazing returns will be greater, especially in the first few years after commencing manuring.

In districts with fairly fertile soils, and where an average annual rainfall of 22in. or more is received, pasture lands should be dressed with the equivalent of from 1½cwts. to 2cwts. of superphosphate per acre per year.

In soils very deficient in lime, in heavy clays, and in peats, a dressing of at least 10cwts. per acre of lime should be given once in every four years, as well as the phosphatic manures.

In European countries, basic slag is the phosphatic fertiliser which gives best results on most pasture lands, and particularly so on heavy, wet, clay soils, but in Australia this phosphate is much more expensive than its agricultural value warrants, and providing that raw rock phosphate is finely ground, it gives quite good returns when sufficient rainfall is received.

FERTILISERS FOR FRUIT TREES AND VINES.

A considerable amount of experimental work in the fertilising of fruit trees and vines has been carried out in most countries where these crops are grown at all extensively, but the results secured are so contradictory that it is quite impossible to lay down any hard and fast rules for manuring them. In most countries, few manuring tests have shown direct profits, except for peaches and grape vines, and the outstanding need of peach trees appears to be nitrogen, whilst vines usually show an improvement when fertilisers containing nitrogen, potash, and phosphoric acid are provided.


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Young trees and vines usually show a marked improvement when regularly manured, and for average conditions a fertiliser containing the following proportions of the required plant food is suitable:—

Nitrogen	5	per cent.
Potash	6	„ „
Phosphoric acid	6	„ „

Such a fertiliser would be made by utilising:—

150lbs. Sulphate of ammonia
220lbs. Superphosphate (36 per cent.)
90lbs. Sulphate of potash
140lbs. Sand

600lbs. Total;

and should be applied at the rate of 6lbs. per tree, or 1lb. to every 8 sq. yds. for vines, preferably in two applications rather than putting the whole lot on the land at one time.

Old fruit trees and vines that are in need of manuring usually require different proportions of the fertilising materials, and a mixture which often proves satisfactory is one containing:—

Nitrogen	3	per cent.
Potash	12	„ „
Phosphoric acid	12	„ „

This can be made by using:—

150lbs. Sulphate of ammonia
550lbs. Superphospate (45 per cent.)
300lbs. Sulphate of potash

1,000lbs. Total;

and should be applied at the rate of about 10lbs. per tree, or 1lb. to every 5 sq. yds. of vineyard.

In all soils not really rich in organic matter, it is good practice and almost a necessity to apply organic matter to the orchard or vineyard if maximum returns are to be secured. In a country like Australia, where farmyard manure is difficult to obtain, the best way to provide this organic matter, and at the same time to fertilise the land, is to grow leguminous crops between the rows of trees or vines, and plough the growth made into the land. For the purpose, tick or horse beans, and field peas, are very suitable crops, and if sown with a dressing of 3cwts. of superphosphate per acre, and ploughed into the soil at flowering time, a very marked improvement to the mechanical condition of the soil and to the growth of the trees or vines is the result. This green manuring is a necessity in sandy soils, particularly where irrigation is practised, and greatly improves soils of heavy texture.

MANURES FOR SPECIAL PURPOSES.

In connection with the use of manures, where a big variety of plants is grown it must be remembered that although the use of the mixture already mentioned under the heading of "Fertilisers for Intense Culture" will prevent the fertility of the soil becoming too low, for maximum results special plants need special treatment. In this connection the following facts should not be lost sight of:—

Phosphoric acid must be put into the soil for all plants, because practically no soils are naturally well supplied with this plant food.

Nitrogen encourages luxuriant growth, and so all plants having greatest value in their leaves and stems should be well supplied with nitrogenous fertiliser.

Potash promotes the formation of flowers, seeds, bulbs, fruits, nuts, etc., and adds to the general hardiness of plants.

A plentiful supply of *organic matter* and *lime* in the soil allows plants to make maximum growth with less manure, because the bacteria increase their activities and liberate much nitrogen, and lime frees some of the potash held in combination.

AIDS TO SUCCESSFUL MANURING.

Manuring of plants is only one of the necessities tending towards full returns, and without the others would be useless, and further, the better the other conditions the greater will be the effects of the fertilisers.

The soil must be well supplied with organic matter to keep it in good mechanical condition, to control the moisture and warmth, and to make it a suitable medium for bacteria to live in.

The soil must be well supplied with lime to counteract excessive acidity, encourage bacteria, and liberate other plant food.

The soil must be well drained, otherwise water keeps it cold, prevents the easy access of air, and does not allow the roots of plants to travel far in search of their requirements.

The soil must be kept well aerated as the roots of plants are in need of air, so are the bacteria, and this supply of air does much towards the liberation of plant foods.

The soil must be well supplied with water by rain or artificial irrigation, otherwise plants cannot make full use of their opportunities.

Liquid Manure.

The liquid manure obtained by collecting what drains away from the farmyard manure heap, or made by steeping animal droppings in water, is a stimulant for many kinds of plants grown in market and "home" gardens, and should be well diluted and applied at the rate of about a gallon to every sq. yd.

A good liquid manure for forcing plants can be made with mineral fertilisers by thoroughly mixing:—

1½ozs. superphosphate,
½oz. sulphate of potash,
1½ozs. nitrate of soda,

in a full kerosine tin of water, and applying it to every 3 sq. yds. to 4 sq. yds. of garden.

Mixing Fertilisers.

All fertilisers cannot be mixed indiscriminately without in some cases incurring losses of available plant food or affecting the mechanical condition of the mixture. Some mixtures lead to trouble in one of the following directions:—(1) Loss of nitrogen in ammonia, (2) reversion of soluble phosphates, (3) by producing unfavorable mechanical condition. In this connection it is always to be remembered that the following of the fertilisers, obtainable in South Australia, should never be mixed:—

Lime and nitrate of lime must not be mixed with—

Sulphate of ammonia.	Superphosphate.
Nitrate of soda.	Animal manures.
Muriate of potash.	Guano.
Kainit.	

Basic slag must not be mixed with—

Sulphate of ammonia.	Guano.
Animal manures.	

UNIT SYSTEM OF VALUING FERTILISERS.

Fertilisers are usually valued on what is known as the unit system, and in this method a unit of any of the fertilising materials is taken as 1 per cent. per ton. For instance, the sulphate of ammonia at present on the market contains 20 per cent nitrogen, which means that 1 ton of sulphate of ammonia contains 20 units nitrogen, and, as this material costs £19 per ton, each unit of nitrogen in the sulphate of ammonia is worth 19s. The same method of valuation applies to all fertilisers, and as it is compulsory for manure merchants to show the analysis of every manure for sale, a knowledge of unit values of the fertilising materials will enable the user to know exactly what he is paying for the part of the fertiliser useful to him.

Unit Values in South Australia.

Based on the actual prices to be paid for some of the fertilising materials in Adelaide at the present—1924—the following list of unit values has been built up, and from it the comparative values of most of the manures on our markets can be calculated:—

Agricultural Unit Values of Fertilisers.

Plant Food.	Unit.	Value of Unit. £	s.	d.	Remarks.
Phosphoric acid ..	Water soluble calcium phosphate	0	2	1	Actual cost in 46 per cent. super.
	Citrate soluble phosphate.....	0	2	0	—
	Acid soluble phosphate.....	0	1	1½	Actual cost in 82 per cent. raw rock phosphate.
	Acid soluble phosphate.....	0	1	7½	In organic manures, as bones, &c.
	Total phosphate in basic slag ...	0	1	11	—
Nitrogen	In Nitrate of soda	1	3	0	—
	Nitrate of lime	1	4	0	—
	Sulphate of ammonia	0	19	0	Actual cost in 20 per cent.
	Blood	1	4	0	—
	Bonedust, &c.	1	4	0	—
Potash	In Muriate of potash	0	5	0	—
	Sulphate of potash	0	7	5½	Actual cost in 45·6 per cent.

The unit value, of course, changes with the fluctuations of the market, but can always be brought up to date by comparisons with actual cost of the various plant foods at any given time. The commercial value is governed by a law of supply and demand, but the agricultural value is not always synonymous with commercial cost, and so every plant grower has personally to decide what will give the biggest profit in his particular conditions, and then, despite the average agricultural value, such fertilsers will be the cheapest for him.

In connection with the above unit values, some manure analyses show nitrogen as its equivalent in ammonia, but it is easy to correct the valuation figures when it is known that 17 units of ammonia equal 14 units of nitrogen.

Comparison of Nitrogenous Fertilisers.

Many experiments have been conducted, testing the availability of the nitrogen in various nitrogenous manures, which affect their unit values, and the results obtained show that when an equal quantity of nitrogen is supplied in the following fertilisers, plants have the power of utilising the amounts set alongside them, compared to 100 for nitrate of soda:—

Nitrate of soda	100
Nitrate of lime	100
Sulphate of ammonia	94
Blood	73
Bone meal	65
Farmyard manure	45

On these figures, the nitrogen in blood and bone dust would be of much lower unit value than in the mineral forms, but cropping experience proves their values to be quite as high as the best of the other nitrogenous fertilisers, and further, the advantage to manure manufacturers of being able to use these substances for their special mixtures is so great that the price of the nitrogen they contain is usually very high.

UNIT COSTS OF SOME PRESENT OFFERINGS, ADELAIDE—1924.

Potassic Fertilisers.

Fertiliser.	Per Cent. Potash.	Cost Per Ton.	Unit Cost.	Unit Cost in England, December, 1923.
		£ s. d.	£ s. d.	£ s. d.
Sulphate of potash	45·6	17 0 0	0 7 5½	0 4 6
Muriate of potash	50·0	16 0 0	0 6 5	0 2 10

Nitrogenous Fertilisers.

Fertiliser.	Per Cent. Nitrogen.	Cost Per Ton.	Unit Cost.	Unit Cost in England December, 1923.
		£ s. d.	£ s. d.	£ s. d.
Nitrate of soda	15·50	18 10 0	1 3 10½	0 16 11
Nitrate of lime	12·75	12 10 0	0 19 7½	0 19 3
Sulphate of ammonia	20·00	19 0 0	0 19 0	0 13 1
Blood manure	8·00	12 15 0	1 11 10½	—

Phosphatic Fertilisers.

Fertiliser.	Per Cent. Calcium Phosphate.	Kind of Phosphate.	Cost Per Ton. £ s. d.	Unit Cost. £ s. d.	Unit Cost in England, December, 1923. £ s. d.
46 % superphosphate .	46	Water soluble	4 16 6	0 2 1	—
45 % superphosphate .	45	Water soluble	4 15 0	0 2 1½	- -
36 % superphosphate .	36	Water soluble	4 5 0	0 2 4½	0 1 10
30 % superphosphate .	30	Water soluble	4 0 0	0 2 8	0 2 0
82 % raw rock phosphate	82	Acid soluble	4 12 6	0 1 1½	-
57 % raw rock phosphate	57	Acid soluble	3 10 0	0 1 2½	
Basic slag	31	Total	6 5 0	0 4 0½	0 1 11

Compound Fertilisers.

Manure.	Cost per Ton. £ s. d.	Fertilising Constituents.	If Unit Value is £ s. d.	Unit Cost will be £ s. d.
(*a*) Bonedust	8 0 0	Nitrogen, 3·25 %	1 4 0	—
		Acid soluble phosphate, 40 %..	—	0 2 0½
(*a*) Bonedust	8 0 0	Acid soluble phosphate, 40 %..	0 1 8	—
		Nitrogen, 3·25 %	—	1 8 8½
(*b*) Bone manure	9 5 0	Nitrogen, 4·5 %	1 4 0	—
		Acid soluble phosphate, 32 %..	—	0 2 5
(*b*) Bone manure	9 5 0	Acid soluble phosphate, 32 %..	0 1 8	—
		Nitrogen, 4·5 %.....	—	1 9 3
(*c*) Orchard manure...	7 5 0	Nitrogen, 1·5 %	1 4 0	—
	—	Potash, 4·5 %	—	0 9 2
		Water soluble phosphate, 20 %	0 2 3	—
		Citrate soluble phosphate, 8 %	0 2 0	—
		Acid soluble phosphate, 4 % ..	0 1 8	—
(*c*) Orchard manure...	7 5 0	Nitrogen, 1·5 %	—	1 12 0½
		Potash, 4·5 %	0 6 6	- -
		Water soluble phosphate, 20 %	0 2 3	—
		Citrate soluble phosphate, 8 %	0 2 0	- -
		Acid soluble phosphate, 4 % ..	0 1 8	—
(*c*) Orchard manure...	7 5 0	Nitrogen, 1·5 %	1 4 0	—
		Potash, 4·5 %	0 6 6	—
		Water soluble phosphate, 20 %	—	0 2 10
		Citrate soluble phosphate, 8 %	0 2 0	—
		Acid soluble phosphate, 4 % ..	0 1 8	—
(*c*) Orchard manure...	7 5 0	Nitrogen, 1·5 %	1 4 0	—
		Potash, 4·5 %	0 6 6	—
		Water soluble phosphate, 20 %	0 2 3	—
		Citrate soluble phosphate, 8 %	—	0 3 6
		Acid soluble phosphate, 4 % ..	0 1 8	—
(*c*) Orchard manure...	7 5 0	Nitrogen, 1·5 %	1 4 0	—
		Potash, 4·5 %	0 6 6	—
		Water soluble phosphate, 20 %	0 2 3	—
		Citrate soluble phosphate, 8 %	0 2 0	—
		Acid soluble phosphate, 4 % ..	—	0 4 8

CONVERSION TABLE FOR FERTILISERS

The ingredients of fertilisers of most importance to plant growers are nitrogen (N), potash (K_2O), and phosphoric acid (P_2O_5), and when estimating the value of any particular manure, the figures showing the fertilising constituents should be converted to these substances, no matter how they may be expressed in the analysis supplied with

the manure, but as it has become customary to express the phosphoric acid content as tri-calcic phosphate (acid soluble phosphate), or as so much tri-calcic phosphate converted into another form, only the compounds of nitrogen and potassium are converted back to the plant foods, and phosphatic fertilisers are valued on their calcium phosphatic content. To help in converting the figures supplied in analyses of fertilisers back to the substances generally used for valuating purposes, the following figures are useful:—

Conversion Table.

To Convert	Into	Multiply by
Ammonia	Nitrogen	0·824
Sulphate of ammonia	Nitrogen	0·212
Nitrate of soda	Nitrogen	0 165
Nitrogen	Ammonia	1·214
Nitrogen	Sulphate of ammonia	4·714
Nitrogen	Nitrate of soda	6·071
Ammonia	Sulphate of ammonia	3·882
Sulphate of ammonia	Ammonia	0·257
Ammonia	Nitrate of soda	5·000
Nitrate of soda	Ammonia	0·200
Phosphoric acid	Tricalcic phosphate	2·183
Tricalcic phosphate	Phosphoric acid	0·458
Sulphate of potash	Potash	0·540
Muriate of potash	Potash	0·630
Potash	Sulphate of potash	1·850
Potash	Muriate of potash	1·585
Carbonate of lime	Lime	0·500
Lime	Carbonate of lime	1·786

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GOVERNMENT EXPERIMENTAL FARM, KYBYBOLITE.

FODDER CROPS UNDER IRRIGATION.

The underground water supplies available in the Kybybolite district have been utilised at the Government Experimental Farm, Kybybolite, for the purpose of producing summer crops, and thus demonstrating the advantages of these crops in districts in which the production of winter crops is problematical, and likely to fail in two seasons out of five. The 1922-23 irrigation cropping at this farm is reported on by the Manager (Mr. L. J. Cook) as follows:—

IRRIGATION EXPERIMENTS AT KYBYBOLITE EXPERIMENTAL FARM, 1922-23.

During 1922 a third area of approximately 3½ acres was graded and prepared for irrigation cropping, bringing the total acreage under irrigation to about nine acres. The whole area was sown to maize and sorghum varieties for grain production.

SEASONAL NOTES, 1922-23.

The months of September and October, 1922, were comparatively wet, over 2½in. of rain being distributed over each month. This prevented the heavy soil of the irrigation area being ploughed and worked to a suitable tilth until well towards the end of October, and delayed planting until the first week in November. Only 32 points of rain were registered during November; hence it was found necessary to give the first irrigation at the close of that month. Good rains fell during December, but these brought cold conditions with them, which considerably checked the growth of such warmth-loving plants as maize and sorghum. January, February, March, and April (1923) were very dry, registering only 70 points of rain during the four months, necessitating an average irrigation during January, and a heavy one during February, when the plants were making their greatest growth. The late summer enabled the plants to ripen their grain satisfactorily, but it was well along in May before some of the plots were ripe.

SORGHUMS.

Block A.

This section of the irrigation area produced a yield of 62bush. of maize per acre during 1921-22. The stubbles were raked and burnt and soil ploughed during the second week of October. It was rolled, cultivated, and harrowed several times until the bulk of soil was in a suitable tilth for sowing. On November 4th and 6th the block was sown with 11 varieties of sorghums, the seeds of which had just recently been received from the United States Department of Agriculture, and represented selections of their latest types of these crops. Small plots of each variety were sown, with a small plot of maize be-

tween each, to avoid unnecessary cross fertilising of the varieties. The seeds were sown in furrows 40in. apart, and 6in. to 8in. apart in the rows. The land was harrowed after the seed was sown, and 1cwt. mineral superphosphate per acre was drilled across the area. This block had received a good dressing of farmyard manure during 1921. None of the varieties germinated really well; especially along the northern end of the area, where the soil is very stiff and tenacious, and such that it is practically impossible to work it into a really good tilth, was germination defective. Spaces were resown during December. The first irrigation was given between November 29th and December 2nd. Very little growth was made during the cold December period. The second irrigation was given on January 11th and 12th, and the third between February 10th and 13th.

The rows were cultivated as soon as possible after each watering, or heavy rain, and again a week or so later to check weed growth, and prevent undue evaporation. The three irrigations were quite sufficient to mature the grain of the ordinarily sown sorghum, but water was again applied to the area in March and April to enable berseem to be sown, and grown in amongst the rows of sorghums and maize. These late waterings affected all varieties of sorghums, producing a lot of secondary growths, and immature, unfertilised seed heads. During March and April the northern ends of the sorghum plots, which were carrying an irregular growth, due to the re-sowing, were cut and fed to milch cows. As the crops had been sown thin, and not with the idea of producing green forage, an accurate weight of forage cut was not taken; but approximately 7 tons were cut from about ½ acre.

The grain of sorghums was ready for harvesting in May, but on account of pressure of work with the ordinary farm seeding, the irrigation fields were not harvested until June.

On June 8th the heads of sorghums were gathered by cutting them off with secateurs, and thoroughly dried under cover. They have subsequently thrashed in the stripper drum, and winnowed.

The following table shows the actual quantity of water received by Block A whilst the sorghums were growing and ripening their grain. It must be remembered that the March and April waterings were not necessary to the sorghum, but were given for berseem cultivation.

Moisture Received by Maize and Sorghums, Block A, 1922-23.

Date.	Rainfall. inches.	Irrigations. acre-inches.	Totals. acre-inches.
1922—			
November	0.32	3.01	3.33
December	2.81	—	2.81
1923—			
January	0.39	3.04	3.43
February	0.31	4.21	4.52
March	0.01	4.35	4.36
April	0.00	2.67	2.67
Totals	3.84	17.28	21.12

The following table shows the yields of grain received from the sorghum varieties. The bushel weight of sorghum has been taken at 60lbs.

Grain Yields of Sorghums Under Irrigation, Kybybolite, 1922-23.

Variety.	Area. acres.	Total Yield. lbs.	Yield Per Acre. bush. lbs.
Red Amber Sorgo	0.044	170	64 24
Pink Kafir	0.058	222	63 48
Dawn Kafir	0.058	206	59 12
Black Amber Sorgo	0.055	193	58 29
Sunrise Kafir	0.056	191	56 51
Feterita	0.062	189	50 48
Dwarf Yellow Milo	0.062	173	46 30
Early Sumac Sorgo	0.028	74	44 3
Kansas Orange Sorgo	0.045	88	32 35
Dwarf Hegari	0.050	88	29 20
Freed Sorgo	0.047	53	18 48
Totals	0.565	1,647	48 35

Three distinct types of growths were amongst the above; the five Sorgos made a lot of tall stalk and leaf growth, and undoubtedly produced the best and greatest quantity of green forage. They have a sweet stalk, and much resemble early amber cane in appearance. The three Kafirs produced a medium growth of stalk with plenty of leaves, and, as the above table shows, they all produced a good quantity of grain. They appear to be useful for either grain or forage production. The varieties, Feterita, Dwarf Milo, and Dwarf Hegari, made short, poor forage growth, but produced a very fine large sample of grain. Observations on the individual characters of each variety are as follows:—

Red Amber Sorgo.—Made a fairly quick growth, averaging approximately 5ft. 6in. in height, with 12 to 14 stools on representative plants. Headed well, in loose panicles, producing red grain of similar nature to ordinary amber cane. Good samples averaged 1.96oz. grain per head.

Pink Kafir.—Made a comparatively large amount of leaf growth, and stooled well, representative plants being 4ft. 6in. high, with 10-12 stalks. It headed particularly well, producing long, cylindrical heads, containing comparatively small, round grains. Good samples averaged 2.9oz. grain per head.

Dawn Kafir.—Much like the Pink variety in growth, except about 6in. shorter. Stooled quite as well, and headed well, but not so long or attractive in appearance. Good samples averaged 2.5oz, grain per head.

Black Amber Sorgo.—The earliest maturer of the lot. Made good quick growth, much similar to the Red Amber. Second growth came away very quickly. Representative plants made 10 to 12 stools 6ft. in height, with heads of loose panicles with flat grain. Averaged 2.03oz. grain per head.

Sunrise Kafir.—The best forage producer of the three Kafirs. Representative plants made 5ft. 6in. of growth, with 10-12 stools. Heads cylindrical, carrying small round grain; 2.42oz. grain per head.

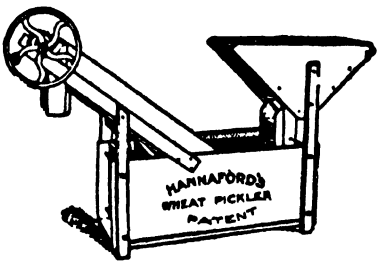
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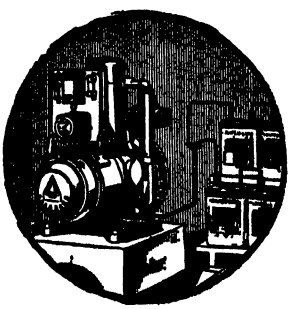
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Feterita.—Made a short thick growth, and headed well. Average plants were 3ft. 6in. high with 12-14 stools. Heads round, compact, and attractive. Grain large, round, and white, weighing 2.1oz per head.

Dwarf Yellow Milo.—Also made a short, thick growth; heads were mostly well filled, but they were short in the stem, and heads did not stand up well above the leaves. Average plants made 3ft. of growth, with 11 to 13 stools. Heads round and compact; grain large, round, yellow, weighing 2.58oz. per head.

Early Sumac Sorgo.—Made a comparatively tall growth, but did not stool so well. Average plants reached 5ft. 6in. high, with 8 to 10 stools. Heads were round and medium, grain small and shotty, weighing 1.98oz. per head.

Kansas Orange Sorgo.—Stood out as the most prolific forage producer, making quite a dense mass of tall, luxuriant growth. Average plants grew 6ft. 6in. high, with 13 to 15 stools carrying plenty of leaves. It was late in ripening grain, and many heads produced very little grain. Grain was medium sized, round, golden color, and well-matured heads averaged 2.75oz. grain per head.

Dwarf Hegari.—Made the poorest showing of all, only making 2ft. 6in. of growth; it stooled well, 10 to 12 per plant, but its heads were poor, and did not stand out above the leaves. Heads were medium sized, and grain large, round, white, weighing 1.6oz. grain per head.

Freed Sorgo.—This variety germinated so poorly that the whole plot had to be resown in December. Germination was then much improved, and though this late growth was light, plants reached to 5ft. in height, with 8 to 10 stools. Heads were light, loose panicles, with white, flat grain, weighing 0.96oz. per head.

MAIZE.

Block A.

The following table shows the yield of maize secured from the plots grown between the varieties of sorghum. As they were all one variety, the plots have been grouped.

Yields of Maize, Irrigation Block A, Kybybolite, 1922-23.

Variety.	Area. acres.	Total Yield. bush. lbs.	Yield Per Acre. bush. lbs.
Improved Yellow Dent—			
(Locally grown seed)	0.086	4 47	57 22
Improved Yellow Dent—			
(Victorian purchased seed) ..	1.020	51 14	50 14
Total for Block A	1.106	56 11	50 42
Farm average	8.066	376 8	46 32

The maize on this block germinated comparatively well, being poor in only a few small, heavy-clay patches. Fair average growth was made by the plants, and they produced a large number of cobs that were comparatively small, and not really well filled. Evidently the small blocks of maize, somewhat isolated between the blocks of sorghums, were the cause of the poor setting of the fruit. It is to be noted that this maize was planted with only 40in. between the rows, whereas all other blocks were sown with the rows 48in. apart. The plot of "Local seed" (saved from the previous season) showed a proportionately better growth during the season, about equivalent to the average acre yields received. The later waterings for berseem did not much affect the ripening of the maize.

Block B.

This section carried maize for grain during 1921 to 1922, and yielded 39bush. 40lbs. per acre without any dressing of farmyard manure. This year there was a fine growth of green weeds ploughed in early in October, and later in the month the soil was worked to a suitable tilth. On November 3rd maize was sown in furrows 48in apart. Several varieties were sown, and grains were planted at different spacings in the rows as a test to show the advantage or otherwise of close or open planting. After the seed was sown, the soil was harrowed, and 3cwts. mineral superphosphate per acre drilled over the block. A very fair germination resulted, and between December 2nd and December 6th the first irrigation was applied. This was followed by a dressing of 100lbs. sulphate of ammonia per acre, broadcasted between the rows, and cultivated into the soil. A second irrigation was given during January 13th and 15th, and the third, last, and heavy irrigation, during February 14th and 19th. The soil was cultivated between each watering. The maize made most of its growth during the warm months of February and March. A small percentage of "leaf wilt" appeared during the growth, but did not appear to affect the growth, or the setting of the grains, to any great extent. The maize cobbed comparatively well, and was ready for picking early in May. The following table shows the actual moisture received by this block:—

Moisture Received by Maize, Block B, 1922-23.

Date.	Rainfall. inches.	Irrigations. acre-inches.	Totals. acre-inches.
1922—			
November	0.32	—	0.32
December	2.81	3.82	6.63
1923—			
January	0.39	1.80	2.19
February	0.31	4.21	4.52
March	0.01	—	1
April	0	—	0
Totals	3.84	9.83	13.67

The following table shows the plots of maize, varieties with different spacings at seeding, with their subsequent yields:—

Yields of Maize, Irrigation Block B, Kybybolite, 1922-23.

Plot.	Variety.	Spacing in Rows 4ft. Apart.	Area. acres.	Total Yield. bush.	lbs.	Yield Per Acre. bush.	lbs.
1.	Boone County Special	Ordinary*	0.60	28	6	46	43
2.	Red Hogan (local seed)	„	0.08	4	30	57	25
3.	Red Hogan (Vic. seed)	„	0.52	19	31	37	37
4.	Early Leaming (Vic. seed)	„	0.24	10	29	44	4
5.	Early Leaming (local seed)	„	0.08	3	4	38	25
6.	„ „ (Vic. seed)	1 grain every foot	0.12	5	32	47	0
7.	„ „	4 grains in hills 48in. apart	0.12	4	0	33	17
8.	„ „	3 grains in hills 36in. apart	0.20	9	7	45	35
9.	„ „	2 grains in hills 24in. apart	0.20	7	7	35	35
10.	Early Yellow Dent	3 grains in hills 36in. apart	0.64	23	32	36	47
11.	„ „ „	1 grain every 12in.	0.64	24	15	37	48
	Totals		3.44	139	43	40	33
	Farm average		8.066	376	8	46	32

* Ordinary spacing is single grains 15in. to 18in. apart.

The following table shows the total variety yields for above area:—

Yields of Maize Varieties, Block B, 1922-23.

Variety.	Area. acres.	Total Yield. bush.	lbs.	Yield Per Acre. bush.	lbs.
Boone County Special	0.60	28	6	46	43
Early Leaming	0.96	39	29	41	11
Red Hogan	0.60	24	11	40	18
Early Yellow Dent	1.28	47	47	37	23
Totals	3.44	139	43	40	33

From the above tables it appears that comparatively close sowing of seeds and spacing of plants would give a slightly greater yield. Local seed, saved from the previous season, produced plants that showed no sign of "leaf wilt," and in two out of the three varieties tried, gave increased yields over the freshly-purchased seed.

Block C.

This block of grass land was graded early in 1922, and dressed with about 60 tons farmyard manure per acre. A good quantity of green weed growth was ploughed under in October. On November 2nd, six varieties of maize were sown in furrows 4ft. apart, and 15in. to 18in. apart in the rows. Land was then harrowed, and drilled with 1 cwt. superphosphate per acre. Irrigations were applied very similarly to those given to Block B. The germination on this block was

not the best, but plants made good growth, and cobbed well. "Leaf wilt" also appeared on these plots, but not to any great detriment to the plants.

Moisture Received by Maize, Block C, 1922-23.

Date.	Rainfall. inches.	Irrigations. acre-inches.	Totals. acre-inches.
1922—			
November	0.32	—	0.32
December	2.81	3.15	5.96
1923—			
January	0.39	2.66	3.05
February	0.31	4.21	4.52
March	0.01	—	1
April	0	—	0
Totals	3.84	10.02	13.86

The above table shows the actual moisture applied to Block C, and the following one shows the yields of the varieties:—

Yields of Maize Varieties, Block C, 1922-23.

Variety.	Area. acres.	Total Yield. bush. lbs.	Yield Per Acre. bush. lbs.
Silvermine	0.60	37 39	62 48
Early Yellow Dent	0.56	29 38	53 7
Early Leaming	0.60	31 32	52 37
Boone County Special	0.60	28 44	48 7
Improved Yellow Dent	0.56	26 47	48 5
Red Hogan	0.60	25 4	41 40
Total	3.52	180 4	51 8
Farm average	8.066	376 8	46 32

Silvermine.—This variety made a very nice growth, reaching 9ft. to 10ft. in height. Cobbed really well, two to the stalk being very common. Cobs, however, were small, and tough on the stem. The grain ripened particularly well, and yielded 81.4 per cent. grain to cobs by weight.

Early Yellow Dent.—Did not germinate well, made good average growth, but did not cob so well as it did the previous season. Cobs were plentiful but small, and not evenly fertilised. Grain weighed heavy, and yielded 82.2 per cent. grain to cobs by weight.

Early Leaming.—Also suffered at germination, but plants made a very good average growth, and produced very fine, large cobs. Grain weighed well, and yielded 84.8 per cent. grain to cobs.

Boone County Special.—Poor Germination, but plants made good growth. This variety produced the largest and best cobs in appearance. Grain weighed light, and yielded 77.4 per cent. grain to cobs.

Improved Yellow Dent.—Did not make as good growth as in the previous season. Cobs were smaller, and not so evenly fertilised. Grain weighed well, but yielded 79.9 per cent. grain to cobs.

Red Hogan.—Made quite an attractive growth, and produced much larger cobs than in 1922, but the yield was disappointing. Grain was light, and yielded 77.5 per cent. grain to cobs.

The following table shows the average yields received from the six varieties grown under trial during the past two seasons.

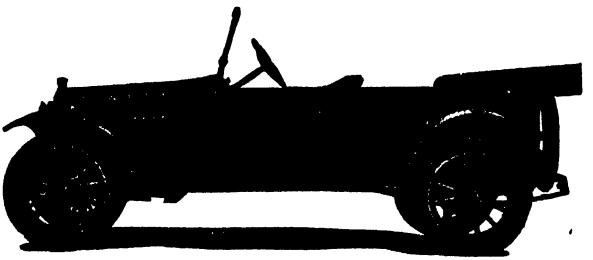
Average Yields of Maize Varieties Under Irrigation, Kybybolite, 1921-22, *and* 1922-23.

Variety.	1921-22. bush. lbs.	1922-23. bush. lbs.	1921-23. bush. lbs.
Boone County Special ..	60 40	47 25	54 7
Early Yellow Dent ..	63 46	42 11	53 3
Improved Yellow Dent	49 41	49 46	49 43
Silvermine	36 20	62 48	49 34
Leaming Early	—	45 33	45 33
Red Hogan	46 13	41 4	43 33
Means .. .	51 44	46 32	49 13

N.B.—All maize has been calculated as weighing 50lbs. per bushel.

BERSEEM UNDER IRRIGATION.

A trial was made with berseem this winter by starting the crop in amongst the rows of summer crops. During March the spaces between the rows of maize and sorghum on Block A were cultivated to as level a tilth as possible, and berseem seed at the rate of 25lbs. per acre was broadcasted over the 2½ acres. The block was then immediately flooded. Seed was sown on March 27th, and by April 12th it had germinated splendidly. As April continued very dry, we were forced towards the end of that month to give a light irrigation—about 3 acre inches of water being applied. The weather broke on May 6th, and since then until end of July rain had been more or less continuous, and soil has been very wet all through the winter. The berseem grew comparatively well during May, especially where sorghums had been cut for green feed. Very little growth was made amongst the tall-growing varieties of sorghums that were left to ripen their grain. The maize plants did not so badly affect the clover, because they ripened off, and did not shelter the clover so much from the sun. During the latter half of June, we were able to cut the better patches of clover with the second growth of sorghums for the dairy herd, but the bulk of it was too short for the scythe, and during early July it was grazed off quickly by the milkers. It then gave good feed for 28 milch cows for eight days. Since then to mid-August the clover has made about 6in. of growth. We should secure good spring feed from it, but as a winter feed this trial has been a failure.



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STINKING SMUT.

TESTS WITH VARIOUS CONTROL METHODS.

During 1923 the Department of Agriculture commenced a series of tests designed to determine the relative effectiveness of a number of different methods of treating seed wheat for the control of Stinking Smut (*Tilletia tritici*). The trials are being conducted on the Government Experimental Farm, Minnipa. The plots, five in number, are relatively extensive, each individual plot being approximately 25 acres in area.

During 1923 the plots, numbered 1 to 5, were sown with seed treated in the manner set out as under:—

Plot No. 1.—Sown with untreated seed.

Plot No. 2.—Sown with seed treated with Faulding's Dollman's Friend, at the rate of one packet of powder to 1½galls. of water, which was sufficient to pickle 6bush. of seed. This was pickled on a concrete floor and turned five times with a shovel, then spread out to dry and sown the following day.

Plot No. 3.—Sown with seed pickled in an old churn with dry copper carbonate at the rate of 3ozs. of powder to the bushel. It was possible to treat a bushel at a time in this manner. This seed was sown during the day on which it was treated.

Plot No. 4.—Sown with seed treated with a 1½ per cent. solution of copper sulphate, at the rate of 1gall. of solution to a bushel of seed. This was pickled on a concrete floor and turned five times with a shovel, then spread out to dry and sown the following day.

Plot No. 5.—Sown with seed treated with a ¼ per cent. solution of formalin at the rate of 1gall. of solution to the bushel of seed. This was pickled on a concrete floor and turned five times with a shovel, then sown the same day.

Field Inspection.

The crops were inspected directly after germination, during the last week in July, and when they had reached maturity. As a result of these inspections, the Manager of the farm, Mr. R. Hill, made the following observations:—

Plot No. 1 (untreated seed).—Came away well, there being a very good germination, and no check whatever in the growth. Stooling was very good right through the plot. There was evidence of smut right through it, but only a trace, and not as high a percentage as in the copper sulphate test. It was particularly noticeable in this plot that there were not the number of small heads commonly known as second growths that there were in the other plots.

Plot No. 2 (Faulding's Dollman's Friend).—This plot came away splendidly, and showed ahead of all the other plots for the first six weeks, but it then had a decided check in the growth. The crop appeared healthy enough, but did not move anything like as quickly from then on. The germination was only fair. The stooling was moderate. The heads were very well developed. There was a trace of smut through it, and the crop was a little later ripening than the remainder.

Plot No. 3 (copper carbonate).—This plot came away with the untreated plot, but the germination was not so good. The stooling was very fair, and the development of head good; but the crop shows as much smut as the untreated plot.

Plot No. 4 (copper sulphate).—This was the last plot to come away, although it had the advantage of being seeded several days before the untreated plot. The germination was fair, and the stooling quite good. There was more evidence of second growths in this plot than in any of the others. There was also considerably more smut in this plot than in any of the others.

Plot No. 5 (formalin).—This came away ahead of the copper sulphate treatment, which was the next plot to it. It showed a very fair germination, good stooling, and the development of the heads was very fair. This plot was more free from smut than any of the others. The only smut to be found in it was an odd head or so right through it.

COMMENTS.

In commenting on the one season's experience of these plots, Mr. Hill remarks that all the fungicides used evidently had a retarding effect on the germination of the grain. No one of them resulted in a crop absolutely free of smut. Formalin was the most successful, the crop grown from seed treated with this containing a mere trace of smut only. The use of Dollman's Friend apparently resulted in a lengthening of the period between germination and maturity.

In all plots on which smut was found, it was worse on patches of land where the soil was hard and the cultivation had not been so good. With the copper carbonate treatment there was no evidence of corrosion on the drill at the time the seed was put through it, but two months later, when the drill was being used for seeding other crops, parts of it had corroded.

ORCHARD NOTES FOR SOUTHERN DISTRICTS FOR MARCH, 1924.

[By C. H. BEAUMONT, Orchard Instructor.]

Much discussion has taken place on the results of spraying with arsenate of lead for control of codlin moth. There are but few growers who do not spray, but some still have a serious prejudice against putting poison on to fruit or food. Weak sprays are not good. Where less than 1lb. of powder is used to 30galls. of water there is certainly a greater percentage of codlin-affected fruit. Again, there is a difference in favor of those who spray several times before the end of the year, with one other spraying about end of January. More particularly I have noted that in the few instances where spreaders are used, much better results are obtained. Some very interesting results from a large Tasmanian orchard were recently published, and the claim made that 95 per cent. is not too much clean fruit to expect.

Fungous pests are prevalent this year. It is good practice to spray apricot, plum, and cherry trees which have been affected by shot-hole —Japanese plums especially need attention.

Pruning of apricot and peach trees may be commenced in the late parts; it is also useful to remove the bearing rods of vines.

Packing for export will be in full swing; study the new regulations, and pack well; give good, clean fruit, and keep up the name of the State. Better boxes are available this year. Fruit for storing should be carefully selected.

Make ready for replacements; take out sick trees, and open out the holes.

Where citrus fruits have not set, try cincturing by one clean cut to the wood, or by twisting wire to compress the bark, just after the blossoms fall. Keep the limbs well off the ground, it helps to ward off brown rot.

Order your trees if you are extending the orchard.

MOUNT GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1924.

Herd No	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during January.	Per Cow during January.	Per Cow August to January.	Per Herd during January.	Per Cow during January.	Per Cow August to January.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
2/A	15	15	8,184	545·60	3,334·39	323·78	21·59	128·61
2/B	9	8·68	6,284	698·22	5,206·83	259·74	28·86	180·12
2/C	16·48	13	6,339·5	384·68	3,252·34	295·24	17·90	122·19
2/E	12·42	12	8,757·5	705·11	4,016·84	354·43	28 54	165·75
2/H	23·10	23·10	14,104·5	610·58	4,129·54	598·18	25·90	158·00
2/I	14	14	9,749·5	696·39	4,346·81	415·99	29·71	165·27
2/J	12·77	12·77	9,933	777·84	5,341·52	418·83	32·80	211·79
2/K	24	22·65	12,297·5	512·39	3,742·30	545·09	22·71	139·79
2/L	24	19·90	12,428	517·83	2,583·37	546·28	22·76	111·66
2/O	36	25·55	10,607·5	294·66	3,065·19	401·56	11·16	114·65
2/R	16	15·77	15,736·5	983·53	6,359·28	660·10	41·26	250·35
2/S	6	5·45	5,352·5	892·08	4,946 03	239·30	39·88	221·25
2/T	12	10·97	9,742·5	811·87	4,802·96	360·01	30·00	176·30
2/U	17	17	12,167·5	715·73	5,110·12	496·22	29·19	197·53
2/V	21	18·97	8,104	385·90	2,909·14	333·77	15·89	115·72
2/W	17	17	11,873	698·41	5,559·81	464·52	27·32	198·46
2/X	35	33·55	20,613	586·94	4,675·88	798·86	22·82	167·74
2/Y	12·06	10·61	8,216	682·92	4,837·42	330·41	27·47	188·82
2/Z	12	10·84	5,903	491·91	3,916·93	251·32	20·94	155·19
2/Aa	25	22·19	9,386	375·44	3,433·30	411·55	16·46	128·91
2/Bb	9	9	4,185	465·00	3,564·94	181·37	20·15	133·83
2/Cc	13	13	6,559	504·54	3,151·05	308·42	23·72	130·90
Means	17·36	15·95	9,841·95	567·06	4,013·05	408·86	23·56	153·99

GLENCOE HERD TESTING ASSOCIATION.

RESULTS OF BUTERFAT TESTS FOR JANUARY, 1924.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during January.	Per Cow during January.	Per Cow October to January.	Per Herd during January.	Per Cow during January.	Per Cow October to January.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
3/A	17	16	13,950	820·59	3,638·78	609·29	35·84	149·77
3/B	16	15	4,929	308·06	1,623·55	240·10	15·01	69·22
3/C	12	12	8,804	733·67	3,352·39	365·21	30·43	130·03
3/D	12	11·52	8,949·5	745·79	2,214·04	375·67	31·31	84·20
3/E	15	11·90	8,549	569·93	2,467·67	377·02	25·13	103·51
3/F	9	9	6,231	692·33	2,910·30	282·43	31·38	113·64
3/G	10	9·23	6,264·5	626·45	3,083·90	246·27	24·63	113·43
3/H	15·26	15·26	9,294·5	609·08	2,512·71	413·08	27·07	92·79
3/I	14	13	7,471	573·92	2,656·46	341·89	25·96	107·89
3/J	14	14	7,378·5	527·03	1,821·86	331·06	23·65	79·16
3/K	22·03	20·48	10,297	467·41	2,653·20	459 49	20·86	107·13
3/L	19	17·42	9,567	503·53	2,435·42	457·49	24·08	94·19
3/M	12	12	6,851	570·92	2,481·46	347·45	28·95	104·93
3/N	20	19·55	12,227·5	611·37	2,402·96	502·45	25·12	96·81
3/O	16·58	14·13	10,705	645·66	2,143·28	384·12	23·17	75·83
3/S	12	10·10	5,779·5	481·62	—	246·88	20·57	—
3/Q	59·87	58·58	27,899·5	465·96	2,661·57	1,188·85	19·85	104·85
3/R	17·84	17·84	11,568·5	648·46	3,028·75	480·42	26·93	127·51
Means	17·42	16·50	9,817·55	563·54	2,593·80	424·95	24·39	103·20

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ADVISORY BOARD OF AGRICULTURE.

Minutes of meeting of the Advisory Board of Agriculture held at the Government Experimental Orchard, Blackwood, on Wednesday, February 13th, 1924. Present—Mr. W. S. Kelly (Chairman), Capt. S. A. White, Colonel J. Rowell, Professor A. J. Perkins, Messrs. J. W. Sandford, C. J. Tuckwell, L. T. Cowan, B.Sc. (Agric.), F. Coleman, H. Wicks, H. S. Taylor, and H. J. Finnis (Secretary).

Welcome to New Members.—The Chairman (Mr. W. S. Kelly) extended a welcome to Mr. H. S. Taylor who took his seat on the Board for the first time, and also to Mr. J. W. Sandford, who until recently represented the Royal Agricultural & Horticultural Society on the Advisory Board, but has now been appointed in a private capacity.

Destruction of Timber on Main Roads.—A resolution from the 1923 Annual Congress of the Agricultural Bureau to the effect that action be taken to prevent the destruction of timber on all roads in the State was brought under the notice of the local Government department, from whom the following report was received:—"It has always been the policy of the department to influence the councils to prevent the needless destruction of timber, and the inspectors individually have done their best to this end. We have given the question of providing for protection of trees on roadsides by legislation very careful consideration, but we do not think it practicable. It will always be necessary to destroy certain trees, for instance, when laying water and other mains, telegraph and electric power wires, when road improvements are being carried out, trees become dangerous, and various other reasons. To make provision in an Act for preventing the destruction of all trees excepting where necessary for the reasons mentioned would, in our opinion, lead to endless confusion and irritation. We think that, generally speaking, the councils have endeavoured to comply with the department's request to protect the timber, and that most of the complaints received have been due to the fact that those complaining did not understand why the timber was being destroyed." A general discussion took place in which Capt. S. A. White and Mr. F. Coleman referred to the need for some steps to control the destruction of timber on roadways. It was decided to endeavour to secure from South Africa and Victoria copies of Acts bearing on this matter and in operation in those States.

Rural Household Science Course.—The Secretary reported having informally discussed a proposal to establish a short course for women interested in agriculture and domestic science. It was decided that the Secretary should draw up a scheme for the consideration of the Board.

Cold Storage of Dried Fruits.—A proposal that dried fruit should be cold stored for the purpose of checking the development of moths therein was referred to the Horticultural Instructor for a report. The Board received from that Officer the following:—

"The inquiries I have been able to make from local merchants and officers in charge of cold stores verify the statements made by Mr. Tuckwell in his memorandum of the 5th instant. These all go to

show that cold stores are utilised to a limited degree locally for the above purpose, but time has not permitted me to search for data further afield.

"As far as I can ascertain, the cold storage of dried fruits has been adopted in Adelaide almost solely for the purpose of dealing with the dried fruit insect problem, but the samples I have seen indicate its value as a preservative of a wider character, viz., to maintain that color, texture, and early lustre usually found in new season's dried fruits. I propose, therefore, making a few remarks on the two phases of preservation—(1) Prevention of insect depredations. (2) Retention of fresh color and texture.

"In so far as the former is concerned, I can gather no evidence to support the contention that the insects are killed by the process, as has been the case with the larvae of the Mediterranean Fruit Fly (*Ceratitis capitata*) when they have been embedded in the pulp of fresh fruit submitted to cold storage for a given number of days. There is much reason for believing that a temperature suitable to the preservation of fresh fruits (33deg. to 34deg. Fahr.) has suspended the animation of eggs and larvae of the two common dried fruit moths—*Ephestia cahiratella* and *Plodia interpunctella*—and of the complete or incomplete stages of the two leading fruit-eating beetles (*Silvanus* and *Tribolium*). The only statement respecting the fatal influences attributable to the cold storage practice is given by the engineer of the Light Square Cold Store, and is stated to take effect on grubs seen on the surface when the fruit is brought out suddenly into a high temperature—the rapid change apparently preventing the functional processes of the animal from readjusting themselves, and death rapidly supervenes.

"In respect to this phase of suspended animation brought about by cold, entomological science has long been aware of, and practised the use of low temperatures adjacent to, but not as low as the freezing point of water, in transporting insects of a high economic value from one country to another, as witness the carrying of repeated consignments of ladybird beetles and other predators and parasites from Australia to America, Honolulu, Fiji, South Africa, and elsewhere, and the transmission of the fig fertilising wasp (*Blastophagus*) from California *via* London to Cape Colony, and holding it for several months dormant in cold storage until the local fig trees put out young fruits—before the eggs of the insects were awakened into activity inside the stored Capri figs.

"There is no evidence to indicate that the larvae or grubs embedded in the compressed masses of fruit would be killed when suddenly exposed, nor is there any to show that the long period of cold storage would destroy the embryo in the egg. There is, however, the possibility that the sudden removal of the fruit from the insulated cold room, might, through the condensation of much moisture thereon, prove detrimental to the maintenance of the good appearance of the product if it be held for a few weeks after removal to the grocer's establishment. There is, therefore, at present no guarantee that dried fruits on which eggs of fruit-infesting moths or beetles are deposited prior to the produce going into the cold store will not become infested

from within when brought out into a warmer and more suitable atmosphere.

"In so far as the rentention of the fresh appearance and texture of these products is concerned, I have no evidence which leads me to believe that the bloom and freshness which they retain in the cool atmosphere will be lost very rapidly providing they are warmed up to outdoor temperatures gradually with a view to avoiding undue condensation of the moisture from the outside air upon their skins. Such a wetting if permitted would, I am afraid, not only result in 'sugaring' at an increased rate from raisins and prunes, which had been dipped at the drying period, but in the case of the former hasten the darkening of the skins, and at the same time encourage the rapid growth of discoloring moulds on peaches and apricots, and possibly fermentation in prunes.

"This subject cannot wholly be separated from other methods of sterilisation and preservation now under experiment, particularly in the United States of America, and to a certain extent in our own country. I refer to the various methods of fumigation with CS_2 under ordinary atmospheric pressure, and CO_2 under vacuum, or sterilisation which incidentally is reached when dehydrators are substituted for sun drying. The methods of preservation after either of these has been employed consist in the use of insect and almost air-tight containers for holding the fruit. It is true all of these add to the cost of putting the fruit on the market, but the point to be worked out is, which will be the greater?

"Drying the fruit in the open air as at present, exposes it to insect infection, and storing it in ordinary stores afterwards increases manifold this liability to insect pests as well as to 'sugaring' discoloration, and loss of texture. To hold it in cold store to repress insects and retain the bloom of freshness until it is wanted for local consumption or export, and to ship it in cool chambers, perhaps to be held again overseas under similar conditions until sold to the distributors, must increase the cost considerably.

"Assuming that ordinary handling charges are the same as under present methods, the following figures may be of interest:—An ordinary 56lb. box measures over all 8in. x 13in. x 23¼in., or equivalent to 1¼ft. of shipping space. The freight to London on ordinary 56lb. box sent as general cargo, I am informed by the local secretary of the A.D.F.A. (Mr. T. S. Oldham), is 2s. 2¼d., calculated at 70s. per ton of 40ft., as against the statement on the authority of the Produce Department of 3s. 3d. per case if shipped in cold storage—a difference of 1s. 0¾d. If held here in cold store, the cost would be 3d. per case for one week (equals 10s. per ton), and 1¼d. per case (equals 4s. 2d. per ton) for each subsequent week, say, 22s. 6d. per ton for the first month, and 16s. 8d. per ton for each succeeding month. I have no figures to show what are the storage charges in the merchants' bulk stores.

"Notwithstanding any experiments in testing the other methods of sterilisation and preservation referred to herein, I consider a series of trials with the keeping in cold storage of a few cases of different kinds of fruits are worthy of attention. As apparently from the experience already gained, no special temperatures other than those used

in keeping fresh apples are required to hold dried fruit in good condition.

"I append to this report a letter received from Mr. F. Cole, of Messrs. Cole and Woodham, of Renmark, along with samples of Smyrna and South Australian sultanas, which former have, of course, been shipped to London and back—by ordinary stowage. The latter, Mr. Cole states, have been packed in their shed since last summer. A sample of dried apricots kept in a cold store since last year and procured by Mr. Tuckwell from the Producers' Cool Store at East End Market, Adelaide, is also forwarded. Although not made from fruits of the highest quality, the cleanness, color, and texture of these fruits would seem to speak well for the benefits of cold storage."

It was decided to recommend the Hon. Minister of Agriculture to institute a series of tests with the object of determining the commercial possibilities of storing dried fruit products in refrigerator chambers.

Conferences.- It was decided that Members should let the Secretary have a statement of the Conferences which they were prepared to attend during the coming 12 months.

Airless Storage of Fruit.—A communication was received from the Blackwood Branch seeking information relating to the Airless Storage of Fruit. It was decided to refer the request to the Horticultural Instructor for a report on the matter.

New Members.—The following additions were made to the list of existing branches:—McLaren Flat—J. Ingoldby, E. Connor, J. T. Powell, T. W. McMurtie; Coonalpyn—S. Angel; Tweedvale—H. N. Nuske, W. H. Fechner; Cygnet River—W. L. Ayliffe; Mount Pleasant —D. Stow-Smith; Lone Gum and Monash—A. Prater, L. H. Lehmann; Kongorong—J. Hay, H. Collins; Renmark—A. Badcock; Parilla Well —H. Petts; Light's Pass—J. Hahn; Tweedvale—F. B. Pulleine; Mannanarie—R. Bayness, H. J. Cundy, J. Clarke; Hartley—G. L. Harvey, W. C. Harvey; Two Wells—E. R. Wheller; Wynarka—A. J. Denton, A. Polkinghorne.

Inspection of Orchard—The Board having during the morning, under the guidance of the Horticultural Instructor (Mr. Geo. Quinn) and the Manager (Mr. R. Fowler), inspected the work being carried out on the Experimental Orchard, the Chairman took the opportunity of expressing his pleasure at the nature of the operations in progress. After several members had spoken, eulogising the orchard and its activities, it was decided on the motion of Mr. H. S. Taylor, seconded by Mr. H. Wicks, "that steps should be taken to bring under the notice of the Minister the Board's sense of the very high value of the work being accomplished at the State Orchard, Blackwood." Reference was also made to the need for compiling and publishing records of the activities of the orchard, and it was decided on the motion of Mr. H. S. Taylor, seconded by Capt. White, "that it be a recommendation to the Minister of Agriculture that such steps as may be necessary to bring about the compilation and publication of the results of the work carried out on the State Orchard, Blackwood, should be taken forthwith, and that if necessary a special grant should be made for the purpose, and an officer set aside to undertake the duties."

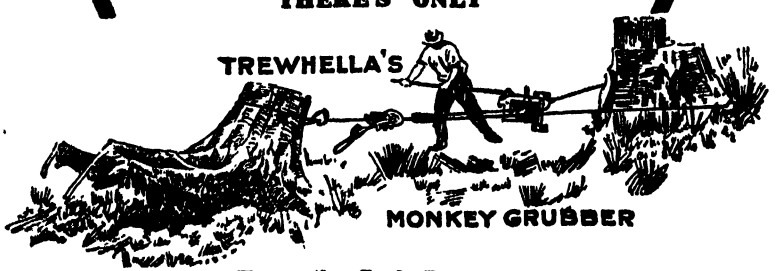
Peas.—The Chairman referred to the prospect of a considerable increase in the quantity of peas grown in this State in the very near future, and suggested the wisdom of taking early steps to ascertain the possibilities of an oversea market. He pointed out that the pea crop could now be harvested as simply as could the wheat crop, and there was every likelihood of its being grown extensively in the heavier rainfall wheat-growing areas as a crop in rotation with wheat. It was decided to request the Hon. Minister of Agriculture to secure from the Trade Commissioner samples of different types of peas marketed in London, together with a statement of the prices which each were bringing. It was also decided to ask that samples of South Australian grown peas should be forwarded to London for the purpose of having them valued, and that the Trade Commissioner might be asked to make inquires as to the extent of the market for South Australian grown peas in London.

Export Apples.—Members strongly protested against the proposal of the Federal Government to permit the shipment of 450,000 cases of "spotted" apples from Tasmania to London. It was urged that such an action would have a detrimental effect on the apple export trade of Australia, and it was decided to ask the Hon. Minister to transmit to the Federal Government an emphatic protest against this alteration of the regulations.

260 MEN FOR YOUR STUMP GRUBBING

With these men at your disposal you could do quite a lot of clearing. In the "**Monkey**" **Grubber** you get their strength, without the upkeep, in a simple, compact, easy to-handle form. With the short lever supplied, the power is in your own hands This sturdy machine is equipped with ropes equal to the heavy demands made on grubbing tackle, and each is fitted with hook and loop couplings—splices and loose pins have been banished A fast gear and rope shortener help you to get quickly to the actual pull, and an automatic lowering gear allows you to release from a strain. Standard equipment will clear 1½ acres from an anchor.

REMEMBER! FOR YOUR GRUBBING THERE'S ONLY



From the Jack People,

TREWHELLA BROS. PTY. LTD., TRENTHAM, VIC.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, reported on March 1st, 1924:—

BUTTER.—The phenomenally cool month just passed has upset all calculations with regard to supplies of butter in this State, and whereas in previous years long ere this it has been necessary to import top-grade butters from the other States to make up the shortage, so far this year there has been very little need for such a course, and at the moment the production in this State is still enough for local trade. Values are firmer than when last reported:—Choicest factory and creamery fresh butter, in bulk, 1s. 6½d.; first-grade bulk, 1s. 5½d.; second-grade bulk, 1s. 2½d.; third-grade bulk, 1s. 1½d.; best separators and dairies, 1s. 4½d. to 1s. 6d.; fair quality, 1s. 3d. to 1s. 4d.; store and collectors', in good condition, 1s. 1½d. to 1s. 3d.; stale and heated lots, 1s. to 1s. 0½d.

EGGS.—There were several fluctuations during the month, and owing to the rates in the eastern States advancing rapidly, values hardened here, but afterwards receded, the quotations at the end of the month being fresh hen, 1s. 2d.; duck, 1s. 3d. per dozen.

CHEESE.—The South-Eastern factories have been consigning regularly each week to our market, and rates ruling have been on a fairly even keel throughout the month, good trade being done. However, with London rates easier and lower quotations being made in other directions, the market has a weaker tendency, the range at present being from 10½d. to 1s. for large to loaf; semi-matured large to loaf, 1s. 1d. to 1s. 2d.; fully matured large, 1s. 2d. to 1s. 2½d.

HONEY.—It was expected with the advance in rates reported in our last that heavier quantities would be arriving, but apparently the take will only be limited, and the market is fairly bare of choice liquid qualities. Some apiarists are still holding some of last season's honey, but, apparently, are looking forward to higher money. Prime clear extracted, in liquid condition, realising 5d. per lb.; best quality candied lots, 4½d.; lower grades, 2½d. to 3d., according to quality. Beeswax, 1s. 3½d. to 1s. 4d.

ALMONDS.—There is very little business being done in these, the larger buyers waiting until the new crop commences to come along. Values at the moment are:—Brandis, 9d. to 9½d.; mixed softshells, 8d. to 8½d.; hardshells, 4½d.; kernels, 1s. 6d. to 1s. 6½d.

BACON.—Until the latter end of the month the values remained unaltered for this line, but owing to the higher prices of the live animal and carry-over stocks having about cleared, the market has firmed. Best factory cured sides, 1s. 3½d. to 1s. 4d.; middles, 1s. 6d. to 1s. 6½d.; rolls, 1s. 1½d. to 1s. 2d.; hams, 1s. 5d. to 1s. 6d.; Hutton's "Pineapple" brand hams, 1s. 9d. Lard.—Hutton's "Pineapple" brand lard, in packets, 1s.; in bulk, 11d. per lb.

LIVE POULTRY.—Supplies this month have kept up fairly well and, generally speaking, good values have ruled throughout. Especially does this apply to prime heavy-weight poultry, but there is also ready sale for the lighter sorts as well. Farmers, however, would do well to pen up and fatten birds before sending, for the enhanced values would more than repay them for the trouble taken. It is expected that owing to the festivities being arranged in Adelaide in connection with the visit of the British Overseas Fleet, strong demand will rule for poultry, so that satsfactory prices seem assured. Loan crate supplied on application. The following rates ruled at to-day's auction:—Prime roosters, 5s. to 7s. 6d. each; nice-conditioned cockerels, 3s. 6d. to 4s. 10d.; poor-condition cockerels, 2s. 6d. to 3s.; plump hens, 3s. to 4s. 3d.; medium hens, 2s. to 2s. 6d.; geese, 4s. 9d. to 6s. 9d.; ducks, good condition, 4s. 6d. to 6s. 4d.; do., fair condition, 3s. to 3s. 6d.; turkeys, good to prime condition, 1s. 3d. to 1s. 9d. per lb. live weight; do., fair condition, 11d. to 1s. 1½d. per lb.; do., fattening sorts, lower; pigeons, 8d. to 9d. each.

POTATOES.—Victorian and Mount Gambier potatoes have been realising from 9s. to 10s. per cwt. on rail, Mile End.

ONIONS.—Best-quality onions, at 10s. 6d. per cwt. on rail.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., JANUARY, 1924.

IMPORTS.

Interstate.

Apples (bushels)	16
Apricots (bushels)	2
Bananas (bushels)	4,106
Lemons (bushels)	2
Oranges (bushels)	3
Passion fruit (bushels)	286
Pineapples (bushels)	164
Peanuts (packages)	1
Potatoes (bags)	4,195
Bulbs (packages)	40
Plants (packages)	21
Seeds (packages)	46
Casks, empty (number)	4,339

Rejected—22bush. bananas, 14bush. pineapples.
Fumigated—59 wine casks.

Overseas.

Federal Quarantine Act.

Seeds, &c. (packages)	3,552

EXPORTS.

Federal Commerce Act.

One hundred and thirty-three packages dried fruit, 94 packages fresh fruit, 1 package honey were exported to overseas markets. These were consigned as follows:—

London.

Plums	94

India and East.

Dried fruit	33

South Africa.

Dried fruit	100

Germany.

Honey	1

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month of and to the end of February, 1924, also the average precipitation to the end of February, and the average annual rainfall.

Station.	For Feb., 1924.	To end Feb., 1924.	Av'ge To end Feb., 1924.	Av'ge. Annual Rainfall
Far North and Upper North.				
Oodnadatta	0·04	0·74	1·39	4·94
Marree	0·04	1·02	0·93	6·07
Farina	—	0·81	1·09	6·66
Copley	0·21	0·81	1·17	8·39
Beltana	0·33	0·52	1·42	8·97
Blinman	0·70	0·92	1·77	12·53
Tarcoola	0·78	1·33	1·22	7·74
Hookina	0·66	0·86	1·13	13·46
Hawker	0·56	0·91	1·21	12·92
Wilson	1·15	1·55	1·31	12·58
Gordon	0·84	1·58	1·41	11·55
Quorn	1·03	1·59	1·34	14·21
Port Augusta	1·56	2·56	1·06	9·67
Port Augusta West	1·69	2·31	0·97	9·71
Bruce	1·00	1·68	1·15	10·77
Hammond	1·10	2·01	1·32	11·91
Wilmington	1·51	2·92	1·50	18·39
Willowie	1·35	2·49	1·22	12·57
Melrose	1·71	3·72	2·13	23·40
Booleroo Centre	1·44	2·65	1·42	15·65
Port Germein	0·93	2·34	1·16	12·89
Wirrabara	1·85	3·09	1·38	19·78
Appila	2·77	4·43	1·11	15·00
Cradock	0·70	1·10	1·28	11·52
Carrieton	0·93	1·74	1·40	12·90
Johnburg	0·65	1·22	1·16	10·91
Eurelia	0·83	1·63	1·47	13·54
Orroroo	0·72	1·41	1·69	13·73
Naokara	0·34	1·12	1·44	11·99
Black Rock	0·90	1·64	1·40	12·75
Ucolta	0·65	1·35	1·49	12·04
Peterborough	0·83	1·87	1·48	13·53
Yongala	1·13	2·31	1·37	14·58
Lower North-east.				
Yunta	0·43	0·91	1·36	8·88
Waukaringa	1·15	1·61	1·12	8·54
Mannahill	0·15	0·63	1·39	8·67
Cockburn	0·59	1·39	1·31	8·31
Broken Hill, N.S.W.	0·34	1·11	1·57	9·98
Lower North.				
Port Pirie	1·17	2·66	1·14	13·55
Port Broughton	1·20	2·51	1·15	14·29
Bute	0·63	1·71	1·12	15·78
Laura	4·03	5·30	1·37	18·26
Caltowie	2·22	2·93	1·37	17·20
Jamestown	1·63	3·28	1·29	17·89
Bundaleer W. Wks.	3·03	4·20	1·28	18·09
Gladstone	2·29	4·15	1·25	16·29
Crystal Brook	2·50	4·52	1·26	15·95
Georgetown	2·62	4·21	1·37	18·55
Narridy	1·42	2·66	1·18	16·37
Redhill	1·02	2·34	1·20	16·94

Station.	For Feb., 1924	To end Feb., 1924.	Av'ge To end Feb., 1924.	Av'ge. Annual Rainfall
Lower North—*continued.*				
Spalding	2·12	3·49	1·33	20·27
Gulnare	3·00	4·25	1·35	19·36
Yacka	2·13	3·40	1·09	15·48
Koolunga	1·36	2·68	1·26	15·89
Snowtown	1·05	2·13	1·11	16·07
Brinkworth	1·25	2·54	1·09	16·30
Blyth	1·92	4·16	1·29	17·03
Clare	2·66	4·65	1·63	24·68
Mintaro	1·90	3·53	1·32	23·57
Watervale	2·55	4·27	1·65	27·54
Auburn	2·17	3·77	1·81	24·35
Hoyleton	2·00	2·88	1·29	17·91
Balaklava	1·60	2·47	1·27	15·95
Port Wakefield	2·32	3·00	1·21	13·28
Terowie	0·57	1·54	1·56	13·82
Yarcowie	0·68	1·61	1·44	14·22
Hallett	1·68	2·95	1·33	16·49
Mount Bryan	2·23	3·83	1·26	16·81
Kooringa	1·73	3·38	1·42	18·09
Farrell's Flat	1·89	3·59	1·37	19·60
West of Murray Range.				
Manoora	1·70	3·12	1·17	18·92
Saddleworth	1·60	3·14	1·45	19·78
Marrabel	1·70	3·09	1·30	19·78
Riverton	1·69	2·99	1·43	20·79
Tarlee	1·17	2·54	1·39	17·93
Stockport	1·29	2·33	1·34	16·63
Hamley Bridge	2·41	3·46	1·41	16·59
Kapunda	1·60	3·37	1·54	19·89
Freeling	1·27	2·34	1·36	17·99
Greenock	1·07	2·64	1·46	21·68
Truro	1·01	2·77	1·41	20·20
Stockwell	1·64	3·15	1·42	20·32
Nuriootpa	0·81	2·18	1·44	21·00
Angaston	1·18	2·69	1·49	22·53
Tanunda	1·40	2·87	1·50	22·24
Lyndoch	2·31	3·79	1·40	22·93
Williamstown	2·03	3·12	1·56	27·48
Adelaide Plains.				
Mallala	2·24	3·25	1·29	16·72
Roseworthy	1·23	2·44	1·29	17·35
Gawler	2·31	3·50	1·40	19·11
Two Wells	2·00	2·65	1·20	15·88
Virginia	1·60	2·07	1·28	17·32
Smithfield	2·10	2·78	1·19	17·24
Salisbury	1·64	2·31	1·35	18·51
North Adelaide	3 41	4·24	1·44	22·37
Adelaide	2·64	3·35	1·36	21·08
Glenelg	2·35	2·46	1·25	18·45
Brighton	2·28	2·70	1·44	21·37
Mitcham	2·21	3·09	1·47	24·26
Glen Osmond	1·82	2·68	1·60	25·94
Magill	2·94	4·02	1·60	25·35

RAINFALL—*continued.*

Station.	For Feb., 1924.	To end Feb., 1924.	Av'ge To end Feb., 1924.	Av'ge. Annual Rainfall
Mount Lofty Ranges.				
Teatree Gully.....	2·72	3·94	1·66	27·77
Stirling West	3·98	6·75	2·60	46·82
Uraidla	3·41	5·80	2·35	44·23
Clarendon	2·56	3·67	1·94	33·09
Morphett Vale ...	2·63	3·27	1·47	22·90
Noarlunga	3·31	3·65	1·27	20·41
Willunga	2·71	3·98	1·53	25·99
Aldinga	2·29	3·10	1·25	20·44
Myponga.....	3·86	4·88	1·90	29·80
Normanville	3·12	3·63	1·19	30·70
Yankalilla.....	3·30	3·73	1·30	23·31
Mount Pleasant ..	0·86	1·81	1·61	27·28
Birdwood	0·79	1·91	1·79	29·39
Gumeracha	1·79	3·27	1·87	33·36
Millbrook Reservoir	2·58	4·44	2·26	36·21
Tweedvale	2·08	3·31	1·83	35·65
Woodside	2·17	3·21	1·86	32·20
Ambleside.....	2·38	4·17	1·90	34·82
Nairne	1·76	3·14	1·85	28·44
Mount Barker	2·01	3·37	1·93	31·30
Echunga	1·79	3·43	1·89	33·06
Macclesfield	1·98	2·99	1·70	30·65
Meadows	3·48	5·19	1·92	36·19
Strathalbyn	1·71	2·74	1·40	19·36
Murray Flats and Valley.				
Meningie	1·98	2·69	1·42	18·74
Milang	1·46	2·03	1·21	15·45
Langhorne's Creek.	1·78	2·08	1·02	14·77
Wellington	1·24	1·76	1·27	14·80
Tailem Bend	1·74	2·23	1·14	14·68
Murray Bridge ...	1·38	1·91	1·14	13·94
Callington	0·93	1·87	1·27	15·49
Mannum	0·97	1·43	0·97	11·66
Palmer	0·57	0·88	1·12	15·46
Sedan	0·57	1·52	1·07	12·27
Swan Reach	0·87	1·52	1·11	11·06
Blanchetown	0·52	1·43	1·07	10·09
Eudunda.....	0·67	2·08	1·32	17·51
Sutherlands	0·36	1·63	0·87	11·20
Morgan	0·75	1·81	0·97	9·30
Waikerie	1·74	2·71	1·31	9·87
Overland Corner ..	0·47	1·33	1·15	11·03
Loxton	1·01	2·16	1·71	12·50
Renmark	0·92	1·74	1·27	11·06
Monash	0·71	1·70	—	—
West of Spencer's Gulf.				
Eucla.....	0·54	0·62	1·19	10·01
White Well.....	1·00	1·07	0·94	9·20
Fowler's Bay	1·02	1·21	0·88	12·14
Penong	2·44	2·44	1·18	12·53
Ceduna	1·40	1·70	0·90	10·25
Smoky Bay	0·71	1·06	0·96	10·98
Petina	0·84	1·12	0·95	12·95
Streaky Bay.....	0·59	0·86	0·96	18·07

Station.	For Feb., 1924.	To end Feb., 1924.	Av'ge To end Feb., 1924.	Av'ge. Annual Rainfall
West of Spencer's Gulf—*continued.*				
Talia	0·50	0·84	0·73	15·32
Port Elliston	0·70	0·96	0·82	16·56
Cummins	0·73	0·79	0·94	18·56
Port Lincoln	0·95	1·26	1·07	19·66
Tumby	0·33	0·51	0·74	14·56
Carrow	0·27	0·53	1·13	14·42
Arno Bay	0·57	1·16	0·99	13·06
Cowell	1·71	1·21	1·01	11·63
Minnipa.....	0·86	1·94	1·88	15·51
Yorke Peninsula.				
Wallaroo	1·15	1·89	1·03	14·15
Kadina	0·82	1·80	0·98	16·02
Moonta	1·66	2·29	1·00	15·35
Green's Plains	1·21	1·92	0·96	15·86
Maitland	4·02	4·89	1·17	20·17
Ardrossan	1·96	2·28	0·94	14·18
Port Victoria	2·10	2·52	0·93	15·50
Curramulka	2·45	2·72	1·06	18·20
Minlaton	2·09	2·41	0·97	17·90
Brentwood	2·50	2·66	0·84	15·83
Stansbury	2·13	2·13	1·05	17·01
Warooka	2·06	2·21	0·96	17·80
Yorketown	1·65	1·92	0·92	17·24
Edithburgh	2·37	2·59	1·00	16·58
South and South-East.				
Cape Borda.....	1·60	2·08	1·15	25·08
Kingscote	0·97	1·31	0·99	19·04
Penneshaw	1·08	1·51	1·42	19·47
Victor Harbor	1·50	2·08	1·46	21·49
Port Elliot	1·47	2·20	1·38	20·12
Goolwa	1·08	1·52	1·34	17·89
Pinnaroo	1·08	1·79	1·53	15·50
Parilla	1·72	1·86	1·05	14·51
Lameroo	2·39	2·89	1·24	16·32
Parrakie	1·13	1·88	0·98	14·58
Geranium	1·59	2·33	0·99	16·62
Peake	1·74	2·42	1·39	16·73
Cooke's Plains ...	1·60	2·50	1·04	15·14
Coomandook	1·72	2·49	1·06	17·49
Coonalpyn	2·39	3·02	1·17	17·40
Tintinara	2·02	2·71	1·12	18·70
Keith.....	2·41	2·92	1·29	18·22
Bordertown	2·99	3·61	1·37	19·39
Wolseley	3·19	3·80	1·17	18·12
Frances	2·25	3·23	1·33	19·73
Naracoorte	2·75	3·56	1·48	22·56
Penola	2·74	3·88	1·80	26·26
Lucindale	3·08	4·01	1·27	23·00
Kingston.....	1·65	2·81	1·35	24·51
Robe	1·67	2·77	1·45	24·69
Beachport.....	1·54	2·22	1·72	27·20
Millicent	2·08	3·50	1·87	29·39
Kalangadoo	3·01	4·79	2·01	32·47
Mount Gambier ..	2·54	4·03	2·26	31·29

AGRICULTURAL BUREAU REPORTS.

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Collie	*	—	—
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Georgetown	*	15	19
Geranium	*	29	26
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Glencoe	817	—	—
Glossop	806	26	23
Goode	*	19	23
Green Patch	*	18	—
Gumeracha	*	24	—
Halidon	*	—	—
Hartley	812	19	16
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Hilltown	*	—	—
Hookina	†	20	17
Inman Valley	*	—	—
Ironbank	*	15	19
Kadina	*	—	—
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Kalangadoo	*	8	12
Kangarilla	*	21	—
Kanmantoo	*	15	19
Keith	*	—	—
Ki Ki	*	—	—
Kilkerran	*	20	17
Kimba	*	—	—
Kingston-on-Murray	*	—	—
Kongorong	820, 824	20	17
Koonibba	*	21	—
Koppio	*	17	14
Kringin	*	—	—
Kybybolite	*	20	17
Lake Wangary	†	15	19
Lameroo	*	21	
Laura	795	22	19
Lenswood and Forest Range	*	—	—
Light's Pass	800	—	—
Lipson	*	—	—
Lone Gum and Monash	*	19	16
Lone Pine	798	—	—
Longwood	812	—	—
Loxton	*	—	—
Lucindale	*	—	—
Lyndoch	*	20	17
McLachlan	*	—	—
McLaren Flat	817	—	—
MacGillivray	*	18	15
Maitland	*	20	17
Mallala	*	17	—
Maltee	*	21	—
Mangalo	*	—	—
Mannanarie	794-5	20	17
Marama	*	—	—
Meadows	817	19	16
Meningie	*	—	—
Milang	813	8	12
Millicent	*	1	5
Miltalie	801	15	19
Mindarie	*	3	7
Minlaton	*	21	—

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Monarto South	*	—	—	Rockwood	816	24	—
Moonta	*	21	—	Rosedale	*	—	—
Moorak	*	20	17	Rosy Pine	*	—	—
Moorlands	*	—	—	Saddleworth	*	—	—
Moorook	*	24	—	Saddleworth (Women's)	*	11	15
Morchard	†	15	19	Salisbury	*	4	1
Morphett Vale	*	20	17	Salt Creek	*	—	—
Mount Barker	*	19	16	Sandalwood	*	—	—
Mount Bryan	*	—	—	Shoal Bay	816	18	15
Mount Byran East	*	—	—	Smoky Bay	*	15	19
Mount Compass	*	—	—	Spalding	*	—	—
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Mundalla	*	19	16	Taplan	*	18	15
Murray Bridge	*	—	—	Tarcowie	*	18	15
Mypolonga	*	19	16	Tarlee	*	—	—
Myponga	*	—	—	Tatiara	†	15	19
Myrla	*	15	19	Tweedvale	817	20	24
Nantawarra	*	20	17	Two Wells	‡	—	—
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Narridy	*	22	19	Veitch	*	—	—
Narrung	*	22	19	Virginia	*	—	—
Neeta	*	—	—	Waikerie	*	—	—
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Riverton (Women's)	*	—	—				

* No report received during the month of February. ‡ Held over until next month. † Formal.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

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If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

ORROROO (Average annual rainfall, 13.42in.).

February 23rd.—Present: eight members.

FLOODING *v.* SPRINKLING FOR IRRIGATION.—The Hon. Secretary (Mr. H. G. Matthews), who contributed a short paper dealing with this subject, said if the water were drawn from a supply of unlimited quantity, irrigating the land by the flooding system should be adopted. Where lucerne was grown the land could be flooded three days before the crop was cut, in order that the young roots of the plants would become established before they were exposed to the heat of the sun. When flooding was practised no outlay of money was required in the purchase of taps, hoses, &c. It might be argued that if the land were flooded weed seeds would be introduced on to the property, and that the land would form a hard crust and crack after the water was applied. Such might prove the case in the event of a heavy and sudden downpour of rain, but where one was able to flood the land at regular intervals, the difficulty would be overcome. Mr. Matthews said many arguments could be raised in favor of the use of the sprinkler. Sprinkling was to be preferred in places where the water supply was limited, because the water washed and cleansed the fodder, and a larger area of crop could be watered in a given time than could be handled by flooding, whilst for starting young plants there could be no doubt that the sprinkling was preferable to flooding.

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

BEETALOO VALLEY (Average annual rainfall, 23.50in.).

February 18th.—Present: 11 members and three visitors.

MAKING THE MOST OF A SMALL HOLDING.—Under this title a short paper was read by Mr. J. B. Giddings, in the course of which it was stated that on a small holding it was advisable to have small paddocks fenced with strong netting and a barb on top, to keep sheep or pigs under control. Land which was suitable for growing fodder crops should be planted with lucerne. Each paddock should be provided with water, but if that were not possible a lane should be laid out so that the stock could obtain water whenever they desired. Shade should also be provided in each paddock for the animals. The stock on a small holding should include two cows for the household, and they should be milked and fed regularly. A few pigs were profitable, and could be fed with little expense on peas and waste from the garden. Horses were necessary to work the holding. A few fowls, if properly cared for, would also prove a profitable investment. A small garden, half an acre in extent, should be planted with mixed fruits and vegetables. The remaining arable land should be cropped, a rotation of wheat, oats, or barley, and field peas being practised. With such a rotation, cropping could be continued for a number of years without fallowing, which was a great consideration on a small holding. If the farmer did not have a pea harvester he could gather the peas with a horse rake, stack or thrash them, and feed them to sheep or pigs. When crushed, peas made splendid horse feed.

FARM BUILDINGS.—Mr. J. Fradd, who read a paper dealing with this subject, said all sheds and buildings erected on the farm were expected to give service for a considerable time, and they should, therefore, be built to the best possible advantage. Sheds and buildings that constantly required repairs were a hindrance to the efficient management of the farm, and gave an untidy appearance to the homestead. A warm, dry stable helped considerably to keep the horses in good condition, and saved a good deal of feed in cold and wet weather. Where possible, the stable should be built on the side of a hill, the back to the west, and the opening to the east. If material were available, the walls should be built with stone, and covered with an iron roof. Walls should be provided with ventilators to keep the stable cool in summer. It should be fitted with a manger, from which either hay or chaff could be fed, with plenty of room at the back for the convenience of those feeding and tending the horses. A strong post-and-rail yard, fitted with well-swung gates or slip rails, was preferable to the post and wire yards too often noticed on the farm. The chaffhouse should be built at the back of the stable, with a door opening on to the back of the manger. The barn could be built of stone and iron, on the side of a hill. A platform on the bottom side raised to the level of the back of the wagon, so that wheat and super could be trucked in or out, would obviate the heavy lifting and lumping that had to be done when the floor was not raised above the ground. Stone and iron could be used for the erection of the implement shed, the back and both ends of which should be enclosed, and the front opening to the east. Wide spans should be provided for the housing of large machinery and implements. The blacksmith's shop was also a necessity, and should be built large enough to meet all requirements. Fowl houses could be built with reinforced concrete or cement, using as little material as possible that would be likely to harbor vermin. Half-inch piping swung from the roof made excellent perches. Stone and iron buildings were expensive, but one should not lose sight of the fact that the first outlay was practically the only cost, because such sheds required very little upkeep. Straw sheds certainly served the purpose in many instances, but one had continually to be carting straw with which to renovate the roofs. When, however, they were erected, nothing but solid timber should be used. Shed forks should be placed into the ground to at least a depth of 3ft. 6in., and about 10ft. or 11ft. apart. Beams cut out of the tops of trees would prove stronger than those cut out of young timber. The middle row of forks should be longer than those on the outside, in order to give the water a good fall. The roof should project over the beams and forks to keep off the rain and give them a considerably longer life. The shed should be kept well covered with straw, otherwise it would leak, and the rain would quickly ruin the timber.

GLADSTONE (Average annual rainfall, 16in.).

February 15th.—Present: 13 members.

SHEEP AND WOOL.—In the course of a paper under the heading, "Australia's Greatest Production," Mr. W. Lines said every farmer could not be a breeder of stud sheep, but each flockmaster should aim at keeping a flock of sheep of high standard, and if he were not able to increase the number of sheep on his property he could assist in raising the quantity of wool per head if care in selecting the rams and culling the ewes were exercised. If that practice were carried out it would not be a difficult problem to raise the average yield of wool per head by 1lb., which would be of great value to both the producer and the country. Many farmers purchased a few sheep when feed was plentiful or when weeds were troublesome on the land, and sold the sheep again, being content to make a few shillings on each animal, but the man who kept a permanent flock would make between 25s. and 30s. with wool and lambs, if he obtained an average drop of 75 per cent. of lambs. It was necessary for the farmer who carried a flock of sheep to have some knowledge of the general terms which were used in the production of wool. Merino wool, when classed, was divided into two distinct types—combing wool and clothing wool. Combing wool was used for the manufacture of worsted goods, and should have a fair length of staple. Clothing wool was used far manufacturing woollen goods, and was generally distinguished by having a shorter staple than the combing wool, and usually it was of a finer quality. Wool with a tender fibre was classified as clothing wool, because it would not

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stand the strain of combing. When classing wool, condition, which denoted the amount of yolk and grease that the wool contained, was one of the main points to be observed. A fleece that was heavy in grease would not give such a high yield, pound for pound, as a light bulky fleece. "Character" was usually applied to the wavy formation that could be noticed on the surface of the fibres of the wool. Character not only denoted the crimp of the fibre, but also embraced all the good qualities of high-class wool. "Lustre" was the glossy metallic brilliance usually confined to English breeds of sheep, whilst brightness was the soft shade of lustre found in the Merino. "Quality" was a term that was used very extensively in reference to both sheep and wool. "Quality" was generally used when speaking of fineness, but it should be used to indicate wool that was well developed and had character, soundness, elasticity, evenness of formation, and was freegrown. Classification of a Small Clip.—When a fleece had been thrown upon the wool table it should be skirted. All stained wool and sweaty edges should be removed. In the case of burry wool, if the fleece could be made free by taking off the shoulders and thighs, it was advisable to do so, but if the burrs were embedded too deeply into the fleece only the edges should be removed. When rolling a fleece, the side nearest the wool-roller should be turned in very lightly, and the other side brought right over; then it should be given another turn to bring the back into the centre. The neck should be folded back as far as the shoulder, and then the fleece rolled from the breech. That would bring the shoulder uppermost, thereby exposing the best part of the fleece. A small clip did not need heavy classing. Any fleeces that were tender in fibre, discolored, or heavy in condition, should be taken out and placed in a separate bale. A general fault when opening the wool on a sheep was to push the hands into the fleece and flatten the staples in all directions, thereby making it quite impossible to inspect the wool in a natural state. When opening the wool, one should be careful not to use pressure, but to spread the staples gently with the thumb and first and second fingers of both hands. The wool would then close again when released, without showing signs of handling. In the discussion that followed, Mr. J. H. Sargent asked the writer whether it was advisable to fill the bale well or only to fill it in lightly. Mr. Lines replied that it all depended on the number of bales. If there were only one bale he advised putting in as much wool as possible. Mr. J. J. Gale said it was advisable to go through the flock before shearing. Many owners simply removed the dirty points of wool, but he believed in thoroughly skirting the fleece. Wool heavy in grease should never be placed with clean wool. In any clip there should always be two classes. Mr. R. E. Lines considered farmers should take more interest in wool growing, and that every man could, with little difficulty, keep a few sheep. Those who kept even a few sheep should make it a point to see that they also had a good ram. In his opinion, there was altogether too much dealing in sheep, which was very detrimental to the industry. The practice among many was to buy up sheep to eat down stubble, and then put them on the market. His experience was that wool growing at the present time was a more payable proposition than wheat growing.

MANNANARIE.

December 20th.—Present: 17 members and five visitors.

Mr. R. Bretag read a lengthy paper, "Merino Sheep and Wool Classing," and a keen discussion followed.

THE KITCHEN GARDEN.—At the November meeting a paper dealing with this subject was read by Mr. L. F. Gerke. The first work, he said, was to select a suitable site, preferably in the backwash from a flooded creek. A good dressing of well-rotted stable manure should be dug into the plot during July or August. For winter vegetables the soil should be prepared immediately after the first rains. Root crops were best sown in beds, and the plants should be thinned out to about 2in. apart in the rows. For parsnips and carrots the soil should be worked to a depth of at least 12in. The soil should be worked down very finely if small seeds were to be sown. After the seeds were sown, it was a good plan to give the plot a light dressing of stable manure to prevent the soil from forming a hard crust. Great care should be exercised in the selection of cabbage and other

vegetables that were to be transplanted, and only healthy seedlings should be set out into the permanent garden. Cabbages and plants of a similar character should be planted about 18in. apart. After they were planted the seedlings should be watered twice a day for the first few days, until they had become firmly established, after which one watering each day would suffice, but it was necessary to keep the hoe going so that the soil would not cake around the plants. Liquid manure could be made by soaking cow droppings in a cask of water, and about a pint of the liquid should be given to each plant three times a week. Herbs, such as thyme, mint, marjoram, &c., could be grown in boxes filled with soil composed of one part of earth to one part of rotted stable manure. Referring to summer vegetables, the speaker first mentioned melons, which, he said, should be planted in holes about 9in. deep and 15in. in diameter, filled with a mixture of old stable manure and earth. The surface of the hole should be somewhat below the natural surface of the soil, so that the water would remain around the plants. Several seeds could be planted in the one hole. Tomatoes could be treated in a similar manner, allowing one plant to each hole. When plants were being watered care should be taken not to allow the water to run too quickly, because it washed the earth away from the stems of the plants, and tended to make the soil crust on the surface. If the garden were properly cultivated, kept free from weeds, and received plenty of water, success in growing vegetables should not be difficult to attain. Another method of making a small garden was to enclose a small area with a stone wall about 3ft. high and 10ft. wide. This should be filled to within a foot of the top with prepared soil, and plants sown therein. The garden could be covered to protect the plants from frosts, which, although rather expensive, would ultimately be a saving, because the wall would protect the plants from hot winds and less water would be required.

WIRRABARA (Average annual rainfall, 18.91in.).
January 26th.—Present: 11 members and one visitor.

THE CIRCULAR SAW.—In the course of a short paper dealing with this subject, Mr. B. H. Borgas said before the saw was used the bench should be screwed up and the bearings firmly held in position, so that there would be no play in the spindle. Prior to starting to cut wood, the saw should be in good order and properly gulleted. If the saw were about 30in. in diameter, and the teeth from 1½in. to 2in. apart, they should be kept gulleted to a depth of ½in. to ⅝in., according to the distance between the teeth. The teeth should be gulleted a little to the back, so that if a line were drawn from the front of the tooth towards the centre, on a 30in. saw, it should show about 4in. to 6in. behind the centre, in order that the saw would draw in the wood instead of pushing it away. He preferred the hog tooth saw, because it cut the wood, whereas the peg tooth was inclined to tear the wood. The saw should be set about half as wide again as the width of the saw, and when it was being sharpened care should be taken not to remove too much from the heel of the tooth. When a saw was newly gulleted, it should be from 4-32in. to 6-32in. lower at the heel than at the point. The saw should be travelling about 9,000ft. per minute. When cutting firewood, the wood should be held against the saw at an angle, in order to prevent the timber from rolling into the saw.

LAURA, January 26th.—Mr. W. H. Campbell delivered an address, in which he dealt with his experiences during a recent visit to South Africa.

MANNANARIE, January 17th.—Mr. T. Chesson read a paper, "Handling and Care of Horses." Several questions on subjects of local interest were also brought before the meeting for discussion.

MANNANARIE, February 14th.—Mr. T. Chesson read a paper, "Handling and Care of Horses," and an interesting discussion ensued. In discussing the question, "The Best Method of Covering a Haystack," Mr. A. T. Symons favored roofing the stack with loose straw. The Hon. Secretary (Mr. W. Crawford) thought the best plan was to use sheaved straw as a thatch, and to fasten it securely in position.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BETHEL.

January 22nd.—Present: 11 members and two visitors.

BREEDING AND CARE OF FARM HORSES.—In the course of a short paper dealing with this subject, Mr. B. Winter expressed the opinion that every farmer should endeavor to have at least one good brood mare, and then obtain the services of the best horse in the district. He considered that a good horse would always bring a good price and that it took no more fodder to feed a well bred animal than a mongrel. In the management of the farm team special care should be given to the selection of the harness. Collars that fitted the shoulders of the horses perfectly should be used, and the harness should be kept free from sweat and dirt. The speaker contended that if the horses were groomed every morning and the collars kept clean, the team would not be troubled with sore shoulders. A keen and interesting discussion followed.

CLARE.

January 18th.—Present: 14 members and visitors.

GRADING AND PACKING DRIED FRUITS ON THE MURRAY.—The Clare and Renmark Branches interchanged papers on the subject, "Packing and Marketing Fruits." The following is the paper by Mr. F. Cole, of Renmark Branch:—"The business of grading and packing dried fruits requires a good deal of experience and expert knowledge. Like most other callings in these days, one has to specialise to succeed. There has been a tendency in the past on the part of some people to imagine that any grower can start in the packing business, put up a 'makeshift' shed, and an old worn-out machine, and ask growers to entrust them with their fruit for preparation for the market. Under these conditions can one wonder that complaints have been made about bad grading and packing. The care with which classing, grading, and packing is carried out determines to a large extent the success or otherwise of the marketing of the product. Every packer should be very careful in his classification of fruits, and watch carefully that the standards are well maintained. I will deal first with classification. This is done at the shed door when weighing in the fruit. Currants have in the past been classed under three grades, which are determined before the fruit is put in the machine. For export three-crown currants are classed in three types, viz., three-crown small, being small fruit; three-crown superfine, being large bold fruit; and three-crown medium, being fruit of a three-crown grade that does not come under the heading of the other two types. The two-crown grade is also classed in three types, but the types are determined by the destination of the packed fruit. If intended for export, the same system as in the three-crown is followed, but if for Australian trade, these types are blended when going through the machine. The only sieve used in the past when grading currants is one with $\frac{3}{16}$in. holes, which takes out the buck fruit, which the elevator conveys to bags ready to go to the distilleries. These two are the main grades; the one-crown and manufacturers' grade are in the minority if good drying weather is experienced, but in years of disaster these latter grades may assume large proportions. In cleaning currants the machine should be carefully watched to see that the stems are being removed, also to see that sufficient blast is put on to blow out all light or red berries, which if left in will spoil the sample. I am not a believer in any patent attachment to grading machines, which saves all this inferior fruit and puts it back into the hopper to be again passed through the machine, until it escapes being blown out, and finally passes into the pack. This is against the principles of good grading, but it will give a low percentage of waste in the treatment of the fruit. The packer must decide one of the two things—Am I to sacrifice quality and purity of grade for a minimum of wastage? or am I to keep up the standard of grades, and not to make the main objective the reduction of percentage of waste? If you wish to be a successful packer and to get a good reputation for the product it will be necessary to study the quality of the fruit. The system followed by the writer when grading three-crown fruit is to place all the 'blow out' coming from the second machine with the two-crown grade to be blended with that class of fruit. This system usually works out

that out of a three-crown grade 5 per cent. is reduced to two-crown, and out of the two-crown grade 5 per cent. is reduced to one-crown. This method always keeps the grades pure and well up to standard. Sultanas graded for export are passed over a $\frac{3}{4}$in. sieve, separating the large from the small fruit, thus making two types of one grade, which are packed and branded Special and Choice respectively. The Commonwealth portion of the pack is a blended sample. The method followed in classing at the receiving door is to keep separate the types of the various grades, consisting of three distinct types, viz., the bottom, the middle, and top of the grade. These three types are blended in the hopper, thus producing an even sample of each grade. The grading of lexias consists in dividing the fruit into three sizes. The classing at the door is done in three grades—five, four, and three crown; each grade is put through the machine separately and run over sieves. In grading five-crown all fruit passing over a sieve with 17-32 holes is packed as five-crown; that passing over a 12-32 sieve is packed as two-crown. All falling through is run through the stemmer a second time, with a strong blast to blow out inferior berries, and is then packed as seedless. If the fruit is a bit on the damp side, this seedless grade will be rather dirty. It will be full of small stalks, which will necessitate running it through the grader a second time, but in any case it is advisable to run this grade through twice. The four-crown is treated the same, but the grade is four-crown from the top sieve, two-crown from the second sieve, and distillery passing through. In the three-crown grade only the large fruit passing over the 17-32 sieve is packed; all the balance is distillery. In my opinion there should be a distinction between the two-crown obtained from the five-crown and that obtained from the four-crown fruit, both fruits being the same size, but of different color. The fruit from the five-crown should be branded two-crown extra or two-crown choice. Pear grading presents difficulties. There is a difference of opinion as to which is the better—hand or machine grading. I favor hand grading, because the machine, using the present riddles with circular holes, cannot grade properly to size, the sample being very uneven in size and

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color. The benefit of hand grading is in grading to color as well as size. There are usually three different colors—the canary color, the pink fleshy color, and fruit of a darker shade, although otherwise very good fruit. To mix these colors in one box would be fatal. Each color is packed separately, and branded with different marks, viz., three-crown special, three-crown choice, and three-crown fine. These brands define the different shade of color. This method of grading and packing is essential when exporting to Great Britain. The box must be faced by placing the fruit in the rows flat side uppermost. The easiest way to face boxes is to make the box upside down, paper and face on the bottom with the fruit, press and nail on the boards, which will then be the bottom. This method overcomes the trouble of weighing out the quantity of the facing fruits separate from the main filling, also avoids the necessity for pressing the box twice. The apricot and peach are packed in the same manner, but these fruits can be satisfactorily graded by the machine. Care must be taken when grading not to overload the machine. If the riddles became overloaded through feeding too rapidly, fruit will pass over, instead of dropping through the holes in the riddle. In purchasing a machine for grading purposes, always have a good margin in hand. For instance, if the business necessitates putting through 26 tons to 30 tons per day, install a 40-ton grader, because the secret in obtaining a good, clean sample of fruit is in giving the fruit plenty of room on the shaking table of the machine. With reference to the power to drive the machine, always have at least an extra five horsepower in reserve; it will be required when a bad drying season occurs, and the fruit comes in sticky. The machine requires more power in this case than in normal seasons, when the fruit is in good order. In conclusion, I cannot emphasise too much the importance of keeping up the standard of the grades, also in cleaning the fruit thoroughly before packing."

Homestead meetings were held during February at the residences of Messrs. R. E. Hunter and W. Patullo.

LONE PINE.

November 30th.—Present: 17 members and seven visitors.

HAY MAKING AND STACKING.—Mr. E. R. Hentschke, who contributed a paper dealing with this subject, said land on which it was intended to sow the hay crop should be ploughed to a depth of 3in. or 4in., and kept free from weeds by subsequent workings with the harrows and cultivator. Seeding should be commenced at the end of April or beginning of May, according to weather conditions. Mr. Hentschke favored a mixture of wheat and oats for hay that was intended for feeding purposes. When the crop was up, and had taken a good hold of the soil, it was advisable to work the roller, thereby strengthening the plants. Before the binder was put into the crop the farmer should see that the wheat and oats were showing a greenish-yellow color. The hay could be left for about one day on the ground, and then placed into stooks, each consisting of from 30 sheaves to 40 sheaves, with the heads pointing upwards. The best method of stacking hay that was required for immediate use was under an iron roof, but where the reserve supplies of fodder were kept in the open, a well-drained site should be selected, and the bed of the stack laid in a northerly and southerly direction, so that the sun could shine on both sides of the stack and evenly dry the hay. If straw were available, it could be used for the foundation of the stack. After the first layer of sheaves had been placed in position, the "ringers" should be bound with the heads towards the centre, thereby making the building of the stack considerably easier. It was also advisable to keep the centre sheaves somewhat higher than the edges, in order to allow for the stack settling down. Before building the roof, a ring layer of neat sheaves should be placed about 6in. over the edges of the stack to form the eaves, then an extra high layer of sheaves could be placed in the centre to form a steep slope to run the water off the stack. He considered it most necessary to cover the stack as soon as possible with a good thatching of straw, which could be kept in position by weighted wires or wire netting. A lengthy discussion followed.

On December 8th a visit was paid to Mr. A. J. Fromm's homestead, when a large number of members and visitors inspected the cereal experimental plots being conducted under Mr. Fromm's supervision.

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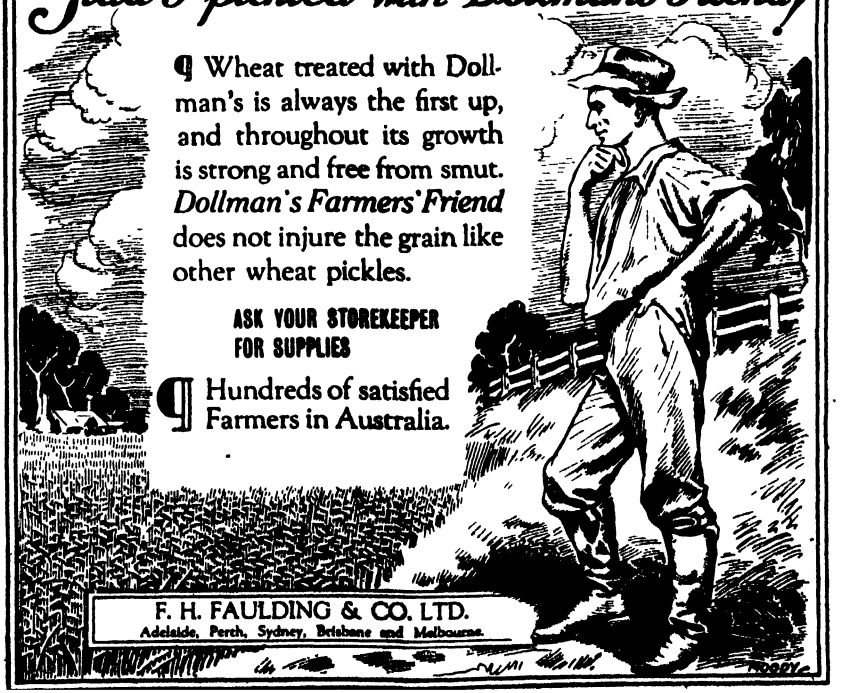
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WILLIAMSTOWN WOMEN'S.

December 5th.—Present: 15 members.

COOKING MEATS.—In the course of a paper dealing with this subject, Mrs. Cundy said for roasting beef the oven should first be heated, and a grid placed on the bottom of the dish to prevent the meat burning. Every quarter of an hour the meat should be basted quickly, and it should be turned once or twice during cooking. Half an hour should be allowed for each pound of beef that was to be cooked. If the meat were very fat it would require cooking for a longer period. The same procedure could be followed in cooking mutton and lamb. Pork and veal required more cooking, because the meat was close grained. For fowls, ducks, and geese a clear and steady heat was necessary. The average bird required from one and a half hours to two hours cooking, providing the seasoning was warmed before the bird was stuffed. Old birds should be steamed for about 45 minutes before they were roasted. It was most necessary that all poultry should be basted, otherwise the tender skins of the birds would burn. Rabbits should be treated in the same manner as poultry, and required from one and a half hours to two hours to cook. If the meat was to be boiled, it should be brought to the boil, and then gently simmered. Pickled pork to be cooked should be thoroughly washed and placed in plenty of water, with the skin side uppermost. A piece 6lbs. in weight would require about three hours' cooking.

LIGHT'S PASS, January 24th.—Eighteen members attended the January meeting, when a paper, "Fruit Drying," prepared by Messrs. A. Chapman and L. Robin, was read. A spirited and educative discussion followed. Messrs. Chapman and Robin, who are two of the youngest members of the Branch, ably replied to a number of questions.

STOCKPORT, January 25th.—The paper, "Farm Management and Efficiency," which had been presented at the Annual Congress was read and discussed. A further discussion took place on the subject, "Pea Growing and Harvesting." Several members reported having seen a pea harvester at work on Mr. W. S. Kelly's farm, at Giles Gorner, and stated that the greatest difficulty in dealing with the pea crop, that of harvesting, had been overcome. Peas that were taken straight off the harvester were quite fit for market.

STOCKPORT, February 22nd.—Mr. S. Nairn gave an interesting address, in which he related some of his experiences during a 12-months' tour of the world. Twelve members and one visitor attended the meeting.

WILLIAMSTOWN, January 14th.—A combined meeting of the Men's and Women's Branches of the Williamstown Agricultural Bureau was held on January 14th. An address was delivered by Miss M. Hardy, a member of the staff of the County Farm Bureau, Vermont, U.S.A., and a paper, "The Export of Plums," was read by the Hon. Secretary (Mr. Geo. Brown).

On February 2nd a visit was paid to the Blackwood Experimental Orchard, and, under the guidance of the Manager (Mr. R. Fowler), the various pruning, spraying, and manurial experiments were inspected.

WILLIAMSTOWN, February 15th.—Thirteen members attended the February meeting, when a paper, "Spraying," was contributed by the President (Mr. W. G. Mitchell).

YORKE PENINSULA DISTRICT.

(TO BUTE.)

WEAVERS.

October 22nd.—Present: 11 members and visitors.

Mr. Dodd gave an interesting lecture, "First Aid on the Farm." A further meeting was held on January 21st, when the question, "Advantages and Disadvantages of the Co-operative Pooling of Yorke Peninsula Barley," was discussed.

WESTERN DISTRICT.

MILTALIE (Average annual rainfall, 14.35in.).

February 16th.—Present: eight members and visitors.

SMUT IN WHEAT.—Mr. J. S. Jacobs read a paper dealing with this subject, and in the discussion that followed Mr. D. P. Bagnell said the eradication of smut was a difficult matter, but he believed that a solution made of equal proportions of bluestone and salt would assist in controlling the fungus. Mr. T. J. McEachen considered the harvester a great help in keeping a wheat crop free from smut, because the machine broke up the smut balls better than the stripper, and so gave the pickle a chance to do its work. He tabled a sample of wheat harvested with the harvester, free from smut balls, but showing the smut dust on the grain. Mr. H. R. Hogan preferred formalin for pickling seed wheat, and advised pickling the bags. Members were notified that the Hon. Secretary (Mr. W. G. Smith) had offered to give a prize valued at £1 for the most useful and instructive paper read at the Bureau during the year. A second prize, valued at 10s., was donated by Mr. H. R. Hogan.

MINNIPA.

FRUIT CULTURE ON EYRE PENINSULA.—Mr. A. G. Collyer Braham read the following paper:—Horticulture has a full share in the ceaseless activity of the age, and therefore appreciable changes have been effected in horticultural practices. The writer considers South Australia has well been styled the "Garden State." It can be confidently asserted that no part of the world is more admirably suited to the production of the very wide range of fruits which are cultivated in temperate and sub-tropical zones than is this State. What would the horticulturists of Europe think of strawberries, cherries, apples, pears, walnuts, raspberries, plums, apricots, peaches, quinces, loquats, grapes, almonds, figs, oranges, lemons, mulberries, persimmons, guavas, and a host of other sub-tropical fruits all growing side by side in a 10-acre block without any artificial aids other than tillage and a little irrigation? And yet this is so in many a garden in South Australia. Fruit culture in South Australia has long since passed out of the probationary stage. From a spasmodic enterprise there has been evolved an established industry having a defined commercial basis. The business of fruit growing now contributes an important amount to the national revenue and the food supplies of the community, and employs many thousands of people. The men in it are up to date, recognising that only by the adoption of scientific methods and unceasing labor they win. The campaign against animal pests and fungi is never relaxed, while the researches of chemistry and entomology play a great part in spraying and manurial formulæ. As I have only had the trees in the farm orchard here under observation for two years, I must be excused if my conclusions in regard to some of them prove faulty 15 or 20 years hence. I must also beg to be excused for passing over each tree so lightly, as one could dwell for at least half an hour on each variety. Preparation of Land for Planting.—Before preparing land for a small orchard in these districts, try to choose a plot that has grown "boxbush" (*Ayxia buxifolia*), as this seems to be the best class of land. Failing "boxbush" country, choose something that has large timber on it. If soil will not grow good specimens of timber or shrubs—well, then, it cannot be expected to grow good specimens of fruit trees. Having selected the site, clear it thoroughly by grubbing and taking off as many roots as possible, thus lessening the danger of attack from termites (white ants). Having done this, plough it deeply—12in. if possible—as we cannot all use a subsoiler. Deep ploughing must be the order of the day for fruit trees, notwithstanding that expert opinion favors shallow ploughing in this country for cereal crops. Having ploughed deeply, constant cultivation must be carried out, so that the soil is exposed to the elements. This will quickly rid the soil of white ants. This cultivation should go on for a whole season, if possible. By this I mean that the prepared ground should not be planted until the following winter. Pegging out the positions for the trees must be done properly. You must measure your distances and sight the lines accurately, whether the distances to plant are to be 18ft. or 20ft. square or not. Choose your trees early; send down your order to the nurseryman in March. Impress on him the necessity

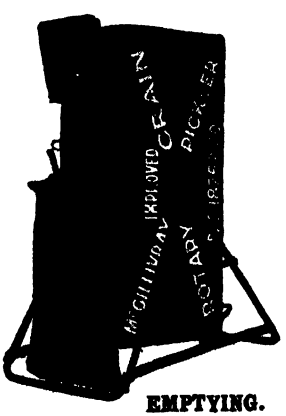
for delivering the trees at the end of May. Early planting in this country applies just as strongly to fruit trees and vines as it does to wheat and oats. Any trees you have to water in the spring will be so constitutionally weakened as to cause their exit before the summer is over, unless they can be watered throughout the summer. Therefore remember that once you commence watering them beyond the "watering in," when they are planted, your trees will succumb in this dry district. When preparing the holes for the plant, 2ft. x 2ft. and 1ft. deep is ample for this class of soil. Take the holes out 2ft. x 2ft. x 1ft. at least a week before planting, and burn some dead wood or roots in each hole. This will destroy any fungi or termites that happen to be in the vicinity, and thus give the tree a better chance as well as provide nourishment for it. As soon as the trees arrive, unpack and examine them. Any roots that are damaged or broken will have to be removed, and if you are not ready to plant them, "heel" them in the soil in a shady place, and water them down until wanted. When planting, the tree is usually put in the soil at the same level as it was when in the nursery. Spread the roots out evenly, and turn the ends of the large roots downwards, and then place the earth back on them, firmly treading the soil whilst filling. Give each tree about 1½galls. of water to settle the roots just after planting, and then leave it until a couple of weeks later, when it should be pruned out. Pruning.—We apply the art of pruning to fruit trees for three special reasons:—1. "To modify the form of the tree to meet the economical cultural requirements, and to counteract unfavorable climatic conditions." 2. "To reduce or stimulate the production of wood growth or fruit bearing, as the case demands." 3. "To remove injured or worn-out parts of the tree." No one can learn pruning by theory alone. One might read all the literature in the world on the subject, and still be unable to prune. To prune correctly you must observe facts. Each tree requires especial treatment. The treatment meted out to one peach tree can seldom be dealt out to the next peach tree in exactly the same way. Each tree differs in growth and constitution from its neighbor. The vigor of a plant is always dependent on the proportion of healthy leaf growth it possesses. Why so? Well, botanical research shows us that the leaves of a plant are like its lungs and stomach, as it is here that it breathes and effects alterations in its food substances, thus making it into plant building material. It follows therefore that the plant that has the most healthy leaf development when food is unlimited must be the stronger grower. In the development of a shoot, the more vertical or upright its position the stronger will it grow, because the natural law of vegetation is that the sap flows more abundantly to the highest point of each shoot. It also follows that as the shoot approaches the horizontal or recumbent, so its vigor will lessen. We know that vertical shoots usually run to wood, while horizontal ones turn to fruitage. If pruning is heavy, the stronger will be the growth arising from the buds retained. We prune severely in the first couple of seasons' growth of the young tree, so that the extra sap drawn into the plant will cause strong growth to arise from a limited number of shoots, forming thereby a sturdy regulated foundation for the tree to be built upon. If we prune heavily, we get fewer but stronger growths; if we prune lightly, we get many but weaker growths. When young trees are removed from the nursery beds quite a number of their roots are broken and bruised, thus causing them to be removed, as if left unpruned decay would set in. As the root system is in accordance with the vegetative system it therefore follows that as the root system is diminished so also must the vegetative system be reduced to produce a proper balance between root and stem. There are two seasons for pruning—winter and summer. Pruning in winter is most important, although summer pruning must be practised as well. Summer pruning only consists of thinning shoots and shortening laterals here and there, while the tree is in vegetative activity. A practical demonstration of pruning on various trees should be witnessed before attempting to do it by oneself. I must add a few words of warning here. If you aim to have an acre or two of orchard do it properly or leave it alone. Do not plant trees with the idea of having something easier to look after than cereal land, because you will be mistaken. You must cultivate and cultivate and cultivate again and again. No weed must be allowed to have room when the trees are needing the scanty moisture available. You must often spray with this and that solution if your efforts to suppress pests are to be

successful. The reply of the Oxford University gardener to a man who asked him how such a beautiful lawn was made was this:—"You cuts it and rolls it for 200 years, and then when you're done that you brings out the roller and rolls it again." And something similar will apply to your cultivations and sprayings to make a profitable orchard. A summary of fruit trees as they present themselves at the Experimental Farm Orchard. Loquats.—The loquat being worked on a quince stock will, I am sure, do well here after they have grown sufficiently large to shelter their own fruits. There is little or no pruning except rubbing off crowding centre shoots the first few years. Figs.—Figs, as presented in some of the sorts at the Farm Orchard are very disappointing. Where the rainfall average is 15in. or 16in. I think certain varieties will do well, but when the annual fall drops to 9in. and none at all during the growing period they present a very sorry spectacle towards the end of February. The pruning is very light, with an occasional shortening back of the laterals and thinning a branch here and there is all that is required. Pears.—Pears of well-chosen early varieties will do well in this climate. They seem very susceptible to root canker or gall, and if this is not removed the white ants quickly find a home there. The pear is rather a slow grower here, but it is usually a long liver, and, given fair conditions, should do well. Pruning consists of allowing four leaders to carry on the framework of the tree and shortening these back for several seasons. The lateral growth is shortened very little until fruit spurs set. Quinces.—Quinces promise to do well in this climate and class of soil. About four main arms are ample for the foundation of the tree; secondary arms can then come off from these in proportion to the growth of the tree. Shorten the leaders back hard for the first few years and then only moderate pruning is required. The fruit is borne on the spindly lateral growth of the current season, which should be just pruned at the tip, as it invariably dies back a few inches if left unpruned. Wherever a fruit

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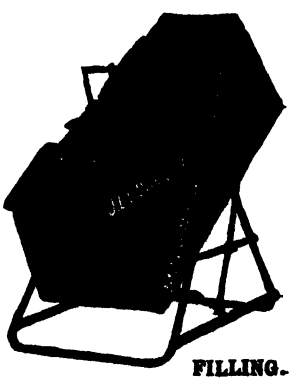


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has been borne the stom will thicken up, and so cause extended lateral growth the following season. Such varieties as "apple," "pineapple," "Smyrna," and "Champion" all do well in the orchard. Apples.—We look upon the apple as a moist-loving tree, and very little faith is pinned to growing this class of fruit here, and yet there are some three varieties that have done exceptionally well in the Farm Orchard, and I think it would be profitable to plant a couple in the farmer's fruit garden. Four main arms, in my opinion, would form a good foundation to work on. Shortening back leaders and any laterals over 15in. long is all the pruning necessary for the first couple of years. Varieties to choose from:—Cleopatra, Jonathan, and Dunn's Seedling. Apricots.—The apricot has done better than any other fruit in the Farm Orchard, and I think it a safe proposition to plant apricots freely. Even during a very dry year they will come out safely each time, because the fruit is harvested early in the summer, and they need very little moisture to carry them through. The pruning is not very hard to master, although a little tedious at times through cutting out the spent fruit spurs. The fruit is borne on the current year's growth, so that constantly cutting out spurs to encourage new growth must be performed. There are some varieties, such as Royal, which need special pruning, that is, the laterals must be left long to encourage such laterals to send out numerous fruit spurs. These laterals must not, however, be allowed to get too far away from the source of sap supply—the secondary arms, &c. Varieties:—Oulin's Early, Moorpark, Tilton, and Royal. The last-named two varieties are best for jam, and the first-named two for dessert. Moorpark and Tilton are best for preserving, while Moorpark is the best variety for drying. Plums.—Plums generally present rather an unpromising appearance at the Farm Orchard, but I think most of the damage has been caused during their early stages of growth. They have been allowed to grow a very tall stem, which suffers from sun-scald. I do not recommend extensive planting of plums, as they not only like a moist climate, but they are also subject to attacks by "borers," termites, and "root gall." They may do better under special and proper treatment from the first. The trees in the orchard lacked attention for the first two and a half years, so that special treatment in the early stages of growth would probably have made all the difference. At least the high "stock" could have been avoided, and thus sun-scald prevented. Nectarines and Peaches.—The nectarine is claimed to be only a smooth-skinned peach, and the pruning and other work is the same for both. Both have done remarkably well in the orchard, but both have taken "root gall" and white ants to an alarming extent. The growth of these trees is rank, which proves that the soil and climate agree with their constitution, and even where the attacks of ants and "root gall" are worst the trees make a bold bid to thrive. Two varieties of nectarines did famously, and two of the early peaches. Late peaches have done nothing at all, and it is a waste of time to try to grow the late canning varieties. The life of these trees may be anything from 10 years to 15 years, even if they contract canker, and if anyone is prepared to plant every 10-15 years then I would say plant some of the early varieties, as they will amply repay, even if they die out in 15 years. The pruning is very simple, and when you have seen it done once or twice you will only require practice to master it. The pruner must always remember that the fruit is borne on the current season's growth, and that when once a spur has fruited it must be cut out to encourage new growth from the secondary arms. I will show you on the board the perfect style of tree, so you may get as near to it as your own particular specimen will allow. Varieties of nectarines:—New Boy and Goldmine. Peaches:—Triumph, Hale's Early, Red May, Wiggins, and Elberta. Citrus.—All the citrus family do better here than almost any other fruit if only irrigation could be practised. But then this is impossible on a large scale in this parched-up country, where water is nearly as precious as gold during their growing season, which is spring and summer. I recommend planting a couple of trees near the house, where a little of the waste water from the home could be given them. There is little or no pruning to do except rubbing out central shoots, thinning now and again, and cutting out dead twigs. Stone and pip fruit have to be pruned like an inverted cone, while the citrus family are kept dome shaped, that is, hollow in the centre but meeting at the top. The chief points to bear in mind are that the lemon bears its fruit on the inside of the tree on short stubby growths, while the orange

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bears its fruit on the outside of the tree, just within the shade of the furthest growth from the centre. Varieties:—Lemons—Lisbon and Eureka. Oranges—Navels—Washington Navel and Golden Nugget; seeded oranges—Joppa, Valencia (late), and Poorman; mandarins—Dancy's Tangerine and Nobilis. Almonds.—Almonds will do well in this country provided the white ants can be kept out. They have not taken canker like their cousins, but the ants seem to attack them as well as the softer wooded trees. The pruning is easy and very light, although some of the drooping kinds have to be pruned to an inside bud to make them more upright in their growth. Varieties:—Hatcher's Nonpareil, IXL, White Nonpareil, and Peerless. Leave Brandis out, as it is a very shy bearer. Vines.—Any of the vines will do exceptionally well on this class of soil and in this climate. The one great enemy of the vine is the white ant. If the ants can be kept out for the first two or three years after planting, then you will get a wonderful return. The best way to grow a number of vines is on the "Thomery Spalier." To make the trellis, place the lower wire 2ft. 3in. from the ground, 15in. above it place the second wire. It is quite low, and so misses a good deal of the high winds that prevail in these parts. Trained on twin arms, 12ft. between the plants; half a chain between the posts seems satisfactory distances. There are 14 different prunings for vines. Most of them do well on the spur-pruned principle, but sultanas must be rod and spur pruned. Therefore three wires are needed for this variety, so that one can tie the rods down to a bottom one. The currant can be spur pruned, but it must be cinctured; that is, a piece of bark must be removed just as the corollas are falling, so as to check the sap, and thus cause a setting of the fruit. The Olive.—I have included the olive here, because I think it is going to do better than anything else we have transplanted. It is known to be a drought resister, a long liver, and a profitable proposition. Trees are easily raised from truncheons in 12 months. The only disadvantage is that they take a few years longer to come into full bearing, but still the length of life will easily compensate for that. Verdale variety carried its first fruits last year, and I estimate that in six years from planting a fair return could be obtained from this variety. We have several varieties, but there seems to be only two that have done exceptionally well—Verdale and Gros Rodineau, although Bouquettier has grown well, but no flowers have shown yet. We have nothing much to cause cross fertilisation except a few insects and these winds, but I am afraid the wind does more harm than good. Therefore a few colonies of bees about the locality would improve matters considerably.

YADNARIE, February 19th.—The first meeting for the new year took the form of a social evening, which was attended by 25 members and a large number of visitors. Several papers were also read and discussed.

EASTERN DISTRICT.

GLOSSOP.

January 23rd.—Present: 27 members.

POINTS FOR THE BLOCKER.—In the course of an address dealing with this subject, Mr. Olorenshaw emphasised the point that in preparing land for planting and watering, the buck scraper should be used as little as possible. The subsoil was nearly always unsuitable for immediate use, and, as a rule, vines that were planted too early in the life of the block usually died. He favored waterings not more than six chains in length, because longer waterings resulted in an uneven distribution. Cuttings should be selected from healthy fruit-bearing canes, which would make good growth, so that the stem could be taken to the wire during the first year. Care should be taken to obtain perfectly upright stems, and to train the arms in the form of a perfect T. Ploughing should be done early, and if peas were planted at the end of February they could be turned under at the end of May. The land should be left in a rough condition until the first irrigation, and immediately after the application of the water it should be disced, working the plough towards the centre of the cultivated area. The cultivator should always follow the work of the disc, so that a rotation of ploughing towards the centre, discing out, and cultivating, would result in level lands at the end of the

season. A heavy furrow should always be thrown back to cover the roots of the vines. "Busters" the speaker considered to be preferable to ploughs for throwing out, because the furrow of the former did not scour so badly as that of the latter. An interesting discussion followed.

NEW RESIDENCE.

February 20th.

SEED WHEAT.—Mr. P. J. Voigt, who read a paper under the heading, "The Best Method of Obtaining Clean Seed Wheat," said it was a very difficult matter for the farmer to keep his seed wheat clean and true to type. The majority of farmers in that district had to resort to the practice of putting the seed wheat throught the winnower or a grader in order to remove barley and other foreign grains, and even then it was only fit for one year's sowing. As a remedy he suggested that the members of the Bureau should co-operate and purchase a truckload of clean, pure seed, which could be given to a farmer who had clean fallow on which to sow the grain. If that plan were adopted the whole of the farmers in the district would, in the course of a few years, be able to obtain, without any difficulty, supplies of good seed. For that district he favored Early and Late Gluyas. Mr. H. Klau, in commenting on the paper, agreed that Late Gluyas was a good yielding variety, but it produced a light weighing and shrivelled grain. Mr. W. Schier stated that Gluyas made too heavy a growth of straw. Mr. T. Tschirpig preferred Silver Bart. Mr. W. Tham favored Walker's Wonder. It was decided that the Secretary should write to the Manager of the Veitch Experimental Farm for quotations of varieties of wheat suitable for the New Residence district.

NETHERTON, February 15th.—Several items of local interest were brought forward for discussion. Consideration was also given to the inauguration of crop competitions and the holding of a tractor trial under local conditions.

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SOUTH AND HILLS DISTRICT.

BLACKHEATH.

January 25th.—Present: 10 members and visitors.

LUCERNE CULTIVATION.—The following paper was read by Mr. H. G. Pym:—"Lucerne requires for its successful cultivation certain definite conditions. It will thrive in a variety of soils, under extremes of heat and cold, and under a greater range of annual rainfall than many other crops, but it requires a good depth of soil. It will not stand wet feet. It has an extraordinary partiality for lime, and if grown on soils lacking in nitrogen this deficiency is readly supplied by the presence in the soil of bacteria which utilise nitrogen from the air, and so transform it into plant food. Lucerne is a long-lived plant. Frequently, after a stand of six or seven years, the plants, whilst still vigorous, become woody, and then it is advisable to plough the crop under and take off crops of maize and wheat before sowing again with lucerne. There are many varieties of this crop, but perhaps the most popular are the Hunter River and Tamworth. Best results are obtained from local seed. Lucerne, of course, will not grow if the rainfall is insufficient, and if this cannot be supplemented by irrigation, heavy or even good yields are out of the question. But before deciding that the district is too dry, we should answer the question, 'What fodder plant will do better?' The heaviest yields are obtained on the best alluvial soils found on river banks—deep, free soils, well supplied with lime and potash, and with free water 15ft. to 30ft. below the surface. The land should be well drained, otherwise the lucerne will die. In preparing land for sowing, one should endeavor to keep the growth of weeds down to a minimum. Young lucerne plants grow comparatively slowly, and are apt to be killed by weeds during their earlier stages of growth. This is particularly the case where the seeds are sown in autumn. It is the practice of some growers to sow 2bush. of field peas per acre, and then plough this crop under before sowing the lucerne, as a means of keeping weeds under control. Do not leave the ploughing under too late in the season, because if this work is done in warm weather, fermentation, which is harmful to the lucerne seed, may commence. Just before the seed is sown, the land should be lightly ploughed and then harrowed and rolled. A firm seed bed is necessary, and to obtain this it may be found necessary to roll twice. Lucerne will not succeed on sour soils, or those which have a strongly acid reaction. It prefers a soil which is neutral or slightly alkaline. Acidity occurs in worn-out soils which have been cropped for many years in succession, or in sour or badly drained land. The free growth of sorrel is an almost certain indication of soil acidity. In sowing lucerne, do not use a nurse crop. In light soil which is apt to drift, it may be advisable to sow a very thin seeding of a cereal in order to protect the young plants from the drifting sand. On dry uplands and for the dry culture of lucerne, thin sowing is the rule—from 4lbs. to 6lbs.; but in rich flat lands from 10lbs. to 15lbs. per acre are used. Lucerne that has been planted for two years will stand an extraordinary amount of cultivation, and benefit thereby. I have tried this on my plot with a springtooth cultivator with narrow shares, and worked it two ways, and one would almost think that the crop had been destroyed, but this year it was thicker and heavier than during any previous season. Lucerne should be cut when about 10 per cent. of the plants are in bloom. If cutting is done on a hot day the lucerne should be raked the same day and put into cocks, and carted before it becomes too dry, in order to secure all the leaves. The valuable part of lucerne is the leaf, and in all haymaking operations care must be taken to see that this portion of the plant is conserved." Mr. J. Pym tabled four cuts of lucerne, showing the length of each different cut. Each cut showed prolific growth, measuring over 12ft. in all. The lucerne was grown on his property without irrigation.

BLACKHEATH.

February 14th.—Present:, eight members and visitors.

FENCING.—The following paper was read by Mr. R. S. Talbot:—"One of the most important items of the equipment of a farm is good serviceable fencing. The work of fencing will be considerably lightened if it is done when the ground is soft, so that the holes can be easily sunk. When erecting fences in hilly and

rough country there are many obstacles to overcome. In rough country the posts can be put, say, half a chain apart, or even more, with three droppers, or one iron standard and two droppers between the posts. For a heavier fence the posts can be spaced 8yds. apart, with one large dropper between the posts. Posts should be cut to suit the nature of the ground—for rough country, say, 5ft. 2in., and for sandy soil 5ft. 6in. But wherever possible I prefer large posts. Leave the post out of the ground from 3ft. 6in. to 3ft. 8in., using five or six wires, which ever is needed, and bore the holes with a ⅝in. bit. Struts for strainers should, in my opinion, be placed between the top and next wire, and at an angle where two are necessary. One should be about 6in. lower on the post than the other, and about half the length. Both struts at the angle should be kept on the same side of the fence, to ensure greater strength to the strainer post. Barb wire can be used to enclose horses and cattle, in order to protect the fence, but where only sheep are kept the barb is not needed. The bottom wire should be 7in. or 8in. off the ground. Wooden droppers can be cut from a tree that will split well. Saw off the logs at the exact length, split and trim them; the chips, &c., make excellent wood for burning. If the farmer has a drilling machine, the task of boring becomes much easier; one man can hold the dropper and one turn the handle. There is no stopping from one hole to the other, and no back turning to pull out the bits. Strainers need not be bored if a patent wire strainer is used. The wire can be strained from any position."

CHERRY GARDENS (Average annual rainfall, 35.03in.).

January 22nd.—Present: 12 members and visitors.

ORCHARD MANAGEMENT.—Mr. M. G. D. Basey, who read a paper under this title, said he proposed to deal with the subject from that stage at which the fruit season had been completed and the winter months were approaching. The work of the orchard could be divided into four separate sections—pruning, cultivation, spraying, and harvesting. After the trees had lost their leaves, and were dormant, pruning was the first work that required attention. He was a firm believer in close spur pruning for the Jonathan, Dunn's Seedling, Rokewood, and Yates varieties of apples. The trees of these varieties were so constituted that unless the wood was kept back short, the fruit would appear on the long unstable laterals, and heavy winds would play havoc with the trees. His experience of pruning the Jonathan was that all of the growth of the present year should be cut back to about three buds, including the base buds. By that means the tree would throw fruit spurs from those buds instead of remaining practically dormant, as would be the case if the laterals were not pruned. He was also in favor of heading back the leaders on the varieties of apples previously mentioned, thereby assisting in throwing back the sap to the fruiting wood and increasing the vitality of the tree. Apples that were subject to bitter pit should not be spur pruned. His practice was to leave such trees until they carried a very heavy growth of wood, and then take out a limb with the saw. The pear required very careful handling for the first year or two, but once firmly established with plenty of fruiting wood it would adjust itself, and require very little treatment with pruning tools. Water shoots and weak laterals should, of course, be thinned out. The very important work of cultivation followed closely on the removal and burning of the prunings from the orchard. Ploughing should, if possible, be completed by the end of September, the land being ploughed two ways to a depth of 5in. or 6in., and then worked with the harrows to form a level soil surface. The remainder of the land around the trees should be worked with the hoe or fork. Then, as soon as possible, a tyne cultivator should be run over the land. If that practice were continued up to the time of harvesting, a moist subsoil with a loose surface soil would be the result. Referring to the manuring of the orchard, the speaker said he had selected several (30) Jonathan apple trees, and given them a mixture of 1cwt. of bone dust and 1cwt. of mineral super. The size and quality of the fruit, as well as the growth of young wood for the next year, showed a marked improvement over the trees untreated. With most trees he did not think manuring necessary, but when there was evidence of a heavy crop being obtained, he considered an application of manure would strengthen the buds for the next year. The next

work was spraying, and the first application was usually to control fusicladium. That disease, combined with woolly aphis and codlin moth, were the chief enemies of the orchards in the Cherry Gardens district. Fusicladium could be controlled with the aid of a power pump and a spray of Bordeaux or Burgundy mixture. Bordeaux mixture could be made in the following manner:—6lbs. of bluestone, 4lbs. of quick lime, and 50galls. of water were required. The bluestone was suspended in a bag placed in 25galls. of water in a wooden vessel, with the bottom of the bag just touching the water. The lime was then slacked in an equal quantity of water, but in a separate vessel. Then the two solutions were blended bucket for bucket in the spray tank. In order to ascertain whether the spray had been made to the correct strength, it was a good plan to test the solution with a piece of red litmus paper. If the mixture were acid, the paper would retain its natural color, but if it were alkaline, it would give the paper a blue color, so if the mixture did not affect the color of the paper it would burn, and lime should be added to the spray until the correct strength was obtained. Burgundy mixture was made with the following ingredients:—6lbs. of bluestone, 10lbs. of washing soda, dissolved in 50galls. of water. The tests for strength were just the same as in the case of Bordeaux. The advantage in using Bordeaux mixture was that it was cheaper than the Burgundy, and did not bring any injurious chemical on to the land. The one disadvantage of Bordeaux was that it would not keep for a great length of time, but it would retain its good qualities for a week, which should be quite sufficient for most orchardists. An addition of 5oz. of casein to each vat of mixture would considerably improve the spreading quality of the spray. A further application of either of those preparations at the time of the first arsenate of lead spraying would, to a large extent, suppress any black spot that appeared after the first spraying. If black spot again made an appearance, lime sulphur could be mixed with lead arsenate at any time, in proportions of 1gall. of lime sulphur and 1½lbs. of lead arsenate to 50galls. of water. Codlin moth, he considered to be the worst pest of the orchardist, but control would be very much simplified if every grower assisted in suppressing the moths. A spray consisting of arsenate of lead with 5oz. of casein as a spreader, and ½oz. of caustic soda dissolved in every 50galls. of water was best. The first application should be made just when the petals were falling, but before the calyx of the flowers closed. A second spraying should be given about 10 days after the first, and the mixture applied should be of the same strength as the first, viz., about 2lbs. of arsenate of lead to 50galls. of water. A third, fourth, and fifth spraying at monthly intervals were, in the opinion of the speaker most necessary, finishing the main crop of Jonathan, Cleopatra, and Dunn's Seedling about the end of January. Careful attention to fruit hanging in large clusters and fruit hanging at the ends of limbs was most necessary. The addition of casein to the spray assisted in holding it between apples, and when the spray dried on the fruit poison would be found wherever two apples touched. Woolly aphis was best attacked in the winter time. A thorough spraying with 2galls. of red oil in 50galls. of water would check the pest when it appeared on the sawed off ends of limbs, &c. Later on in the season, when the leaves appeared on the trees, a preparation that would not burn was necessary, and nicotine sulphate used at the rate of ½ pint to 50galls. of water, if carefully applied, would wipe out the insects. If time permitted, the orchardist would be well repaid if he visited the orchard and thinned out the apples, removing those fruits that were spoiled with black spot or codlin moth. In connection with harvesting the crops, the grower should first be assured that he has sufficient room in which to handle the fruit, and an ample supply of cases on hand. One of the main difficulties in harvesting was met with when the fruit hung in large clusters on the trees, and perhaps only one or two fruits were ready for picking, yet the whole cluser would come away when the fruit was touched. That could be overcome to a large extent if the spurs were thinned out during pruning. He had come to the conclusion that better Jonathans were obtained if the spurs were thinned out rather heavily. If it was intended to place the fruit in cool storage, it should be left out in the night air, and delivered to the store as early as possible the following morning. A keen and informative discussion followed, and Mr. Basey replied to numerous questions.

W & W., 889

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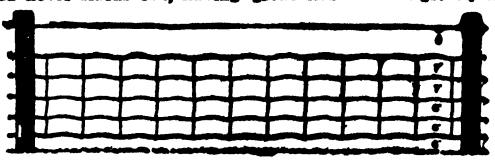


Fig. 7—Cyclone Special Spring Coil Sheep Fence.

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HARTLEY (Average annual rainfall, 15in. to 16in.).
January 24.—Present: 11 members and visitors.

LUCERNE GROWING.—In the course of a paper dealing with this subject, Mr. H. S. Stanton said, in preparing a field for lucerne, no effort should be spared in the thorough cultivation of the land. The expense incurred in establishing a plot was heavy, but a good stand, which would last for a number of years, would amply reward the farmer for his labor. There was little difference, if any, in the method of preparing land for lucerne from that required for growing a crop of any of the cereals. There were, however, such operations as subsoiling, which were not warranted in the production of a cereal crop, yet for lucerne they would be amply justified. Experience showed that if rain fell after the seed had been sown it was quite safe to harrow within six days. The harrows would possibly destroy many of the young plants just ready to break through, but they left the soil in an ideal condition so that those seeds that survived made a thick stand. If harrowing were neglected, scarcely a seed would succeed in breaking through the surface of the land. That, of course, applied in those classes of soils that were inclined to set hard and were deficient in humus. The rate of seeding depended almost entirely on the conditions of the district, but as a rule 10lbs. to 12lbs. could be sown. The rate of seeding, he believed, was not such an important point as the preparation of the seed bed, the method adopted in sowing the seed, and the subsequent weather conditions. The general rule was to sow lightly under the most favorable circumstances. About the end of July was the best time for sowing in that district. Generally, harrowing and rolling should precede the final operation of sowing the seed. The seed should be covered with dust to a depth of ¾in. Failure to grow successful crops of lucerne was in most cases due to deep sowing. The best plan to adopt in order to prevent deep sowing was to release the rod that connected the hoes to the stump jump springs of the drill so that each hoe would work independently. It had been found that the weight of the hoe when so swivelled was sufficient to cover the seed. Whether the implement passed over a bump or ran into a hollow the seed would be sown at the same depth, for the hoes were quite independent of the wheels. A keen discussion followed.

HARTLEY (Average annual rainfall, 15in. to 16in.).
February 13th.—Present: 18 members and visitors.

RABBIT DESTRUCTION.—On Wednesday members met and gave a demonstration on blowing up burrows with explosives, Mr. J. M. Hudd being in charge. A start was made on Mr. H. H. Cross's property, where some very large holes were dealt with. These holes will be watched with interest, as they have been the homes of rabbits for many years. Mr. D. F. Westwood's property was next dealt with, followed by Mr. J. M. Hudd's. Here the party sat down to lunch prepared by Mrs. Hudd and family. Rabbit warrens on Messrs. Davey, Wellar, and Howard's properties were also destroyed with explosives.

THE VALUE OF OATS.—The following paper, under the heading of "Benefit of Oats on a Small Farm" was contributed by Mr. C. S. Hassom:—"Experience has taught me that oats should be grown on every farm. If sown early in the season, even on dry land, oats will produce more feed than grass land, and then return a good harvest. They can be made to form part or the whole of the ration fed to almost all classes of farm animals, because in themselves they are a balanced ration for young or old stock. For horses, no substitute has been found that will give and maintain the same degree of mettle and staying power, either in the racehorse or the heavy farm worker; and for cows, oats are at least as valuable as bran for cream production. One piece of ground I sowed dry after grazing over three months cut over a ton of hay per acre."

LIFE MEMBERSHIP.—Mr. D. F. Westwood (Chairman) presented a life membership certificate of the Agricultural Bureau to Mr. S. Pratt, who has given 20 years of service to the Agricultural Bureau of South Australia.

LONGWOOD (Average annual rainfall, 37in. to 38in.).
January 19th.—Present: eight members and visitors.

HOMESTEAD MEETING.—The monthly meeting of the Branch was held at Mr. R. Higgins's residence. An interesting feature of the property was the system installed by Mr. Higgins for irrigating by gravitation. Good crops of potatoes,

and tomatoes came under the notice of members. In the fruit garden visitors favorably commented upon the healthy and clean appearance of the fruit. Mr. Higgins then directed the attention of members to a plot of loganberries, remarking that the bushes were very productive, and that the berries made excellent jam. Afternoon tea was provided by Mrs. and Miss Higgins.

MILANG.

November 10th.—Present: 20 members.

PIG RAISING.—Mr. W. J. Varcoe, who contributed a paper on this subject, said that pig raising had been a very profitable sideline for the dairyfarmer for the past few years on account of the high prices received for pigs. There was no farm animal that ate more in proportion to its weight or turned its food into a saleable carcass so rapidly as the pig. For sows and for growing pigs green feed should form the greater part of the ration, and when possible they should graze it for themselves. In addition to their sties, it was necessary to have a small paddock well fenced with pig netting and two barb wires, one along the ground and the other 4in. or 5in. above it, to keep the pigs from rooting the netting. In that paddock Cape barley should be sown when the early rains came, and that would make a good feed for the pigs to graze upon; it would also reduce the cost of raising the pigs in comparision with feeding grain alone. A supply of grain would also be required, and Cape barley would make a good feed besides being a good yielding crop to grow. Any grain could be used, but it should be well soaked or crushed before feeding to the pigs. The best breed to keep, he thought, was the Berkshire, but whatever breed of pig was kept it would not be a success unless it was well fed. The boar should be the first consideration. He should be pure bred and not used for stud purposes until eight or nine months old. The sow should be long, roomy, and deep, with broad loins and a strong back; she should possess about 12 evenly formed teats, and should not be mated until eight months of age. A sow should produce two litters a year, and breeding should be so arranged that the animal did not farrow during the winter time. March and September were the best months for farrowing, the weather being more temperate and suitable for the rearing of pigs. The sow should not be allowed to become too fat or a whole litter might be lost. About one week before the sows were expected to farrow they should be put in a pen and fed on soft food. After pigging they should be gradually fed up with grain and milk. At three or four weeks old the suckers would begin to feed themselves, and should be fed in a shallow trough by themselves. At four or five weeks of age the boar pigs should be castrated, and at seven or eight weeks could be weaned. They should be well fed for two or three weeks after weaning, and could then be put in the paddock and given grain and milk every morning and evening. When old enough to be fattened, they should be brought back to the sties and given as much grain and milk as they could clean up, four times a day. Pigs should not be marketed unless they were in prime condition, because it was the good quality that brought the best prices.

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RAPID BAY.

January 5th.—Present: 23 members.

TRAINING A SHEEP DOG.—Mr. A. E. Bennett, in the course of a short paper dealing with this subject, said the training of a dog that it was intended to use for working sheep should be started when the animal was about two or three months old. To obtain the best results it was necessary that the dog should be trained under one master and at the age of five or six months. The young dog, if the early training had been correctly performed, should, at the word of command, sit down and remain in one position until further orders were given, even if its master was out of sight. The first training should consist of the young dog being taken out walking in a paddock in which there were no sheep. The dog should not receive its first lessons in working sheep until it was at least nine months old, and it should be fast enough to overtake a sheep on the run, otherwise it would be encouraged to run up closely to the sheep and bark. When starting out to work the sheep the dog should be held on a leash and taken into a paddock containing a flock of about 50 sheep. The sheep would then, as a rule, immediately circle, when the dog could be loosed and allowed to run around the flock two or three times. The dog should then be called to heel and carried home. That part of the education should be performed three or four days in succession, care being taken not to check the dog during that time. On the next visit to the flock a stick should be held in the hand of the master and the dog made to work on the opposite side of the sheep from where the master was stationed. After that had been repeated a few times, the dog could be brought behind the sheep to help its master in driving the sheep. In commanding the dog to work around the moving flock the master should always first bring the dog to heel before issuing a fresh order, the dog always being directed at right angles to the flock, in order to encourage it to work outwards from the sheep. A lengthy discussion followed. Samples of green maize and Federation wheat were tabled for the inspecion of members.

RAPID BAY.

February 16th.—Present: 22 members.

CARE OF FARM MACHINERY.—Mr. G. Lord, in the course of a paper dealing with this subject, said the plough did not need a great deal of attention, the main points being to keep the bolts and nuts screwed up tightly and the axles well oiled, because the dirt soon collected around them and cut away the axles. If the cultivator were worked in stony or rough ground, care should be taken that the machine did not become hooked in roots or stones, and thus strain the tynes. The tynes of the harrows should be sharpened and screwed up so that the work would be done properly. They should not be left out in the paddocks, because the grass grew over them, and they became dangerous to horses. The drill should be thoroughly overhauled prior to each seeding. The stars should be taken out and well cleaned, and any broken cogs replaced. If rubber hoes were used, they should be taken off after each season, and put in the seed box to prevent their perishing. The binder should be given a thorough overhauling before hay cutting was commenced, in order to prevent delay after starting. The canvasses should be slackened after each day's work was completed. If they became wet they were apt to split. Strippers and harvesters should always be protected from the weather when not in use. During wet weather the bearings should be examined, so that they would be in working order for the succeeding season. The wheels, when left exposed to the weather, should be given a coat of paint or raw linseed oil about every two years. Wagon wheels, &c., should be cleaned and given a coat of paint at least every two years in order to protect the wheels and preserve the wood. When kept in sheds they did not need painting quite so often. Wheels with loose tyres should be taken to the wheelwright and retyred, thereby saving the cost of a new wheel. Sheds that were used for housing harvesters, strippers, binders, and other implements should be fowl-proof. It very often took a long time cleaning the machines after fowls had been roosting on them, and in most cases they were smothered with fowl lice. Grasscutter poles or shafts, when exposed to the weather, should be given a dressing of linseed oil to prevent their cracking. Fencing wire should not be used in the place of bolts.

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ROCKWOOD.

January 21st.—Present: 15 members.

THE INTERNAL COMBUSTION ENGINE.—The following paper was read by Mr. H. C. Dunn:—"An internal combustion engine derives its power from expansion, resulting from the burning of a mixture of a gas, or of some inflammable vapor and air, compressed at one end of the cylinder. There are several fuels in common use, the principal being gas, gasoline, kerosine, and alcohol. Most engines of small power are of a type known as 'four-cycle,' but there are also many 'two-cycle' engines. An engine is called 'four-cycle' because it requires four strokes of the piston for every impulse resulting from the explosion of the compressed gas. The first out-stroke of the piston fills the cylinder with a combustible mixture. Upon the first return stroke all valves are closed and the mixture is compressed. Just before this stroke is completed the compressed mixture is ignited, and as it expands it drives the piston on its outward or working stroke. During the second return stroke the exhaust valve is held open, and the burnt gases are forced out by the moving piston. The two-cycle engine requires only two strokes or one revolution of the flywheel for each impulse. The incoming charge necessarily mixes somewhat with the burnt gases not yet thoroughly driven out, and for this reason the two-cycle engine is neither as economical nor as reliable as the four-cycle engine. However, because of the light weight, and because power is applied more uniformly, the two-cycle is used extensively and to good advantage under many different conditions, particularly for marine work. Engine Troubles: How to Locate and Correct Them.—All ordinary troubles encountered whilst operating a gasoline engine may be divided into four classes—(*a*) Those that prevent the engine starting, (*b*) those that cause a 'dead' engine after running a short time, (*c*) those that cause a loss of power, and (*d*) miscellaneous, such as cylinder troubles, worn valves, smoke, leaky gaskets, fuel supply, bound and hot boxes, and cracked water jackets. Troubles which prevent an engine from starting are numerous. Difficult starting may be caused by faulty ignition, not enough fuel, too much fuel, water in the cylinder, and loss of compression. When it seems impossible to start the engine, look firt for faulty ignition. The cause of non-ignition (when the engine fails to ignite the first few charges) will not be removed by turning the wheels, but starting will become more difficult the longer they are turned, because the engine cylinder will become flooded with fuel. There is also a danger of filling the muffler and exhaust pipe with a risk charge, which, when ignited, is apt to rupture the muffler. Not Enough Fuel—The engine will go up to normal speed within a few seconds after starting if it is receiving fuel in proper proportion, and the ignition is in good working order. When working under a load it should take a charge every three or four revolutions and fire each charge. A dead explosion and black smoke issuing from the exhaust pipe indicate that the engine is receiving too much fuel, because the charges that are taken in are not all ignited or thoroughly burnt. It is possible to choke down an engine by feeding too much fuel, just as easily as by not feeding enough. Do not feed more fuel when more power is wanted. Flooding the cylinder is frequently the cause of the engine failing to start. Loss of Power—Leaky valves, worn piston rings, misfiring, choked inlet and exhaust passage, and back firing. If the valves are leaky, they permit loss of compression. They should be taken out at once and cleaned and reground, if necessary, so that they seat perfectly. See that they work freely and easily in the valve guides. If the stems are gummed, use a little kerosine or petrol to loosen them. Leaks in valves may be detected by turning the engine against the compression and listening for escaping charges. If there is a barking noise in the cylinder it indicates the escape of the explosive force past the piston rings. If the rings are worn to this extent they should be carefully filed or replaced by new ones well fitted into their grooves, so that they bear at all points of their circumference on the cylinder wall." An interesting discussion followed.

SHOAL BAY.

December 18th.—Present: 16 members.

MOUSEPROOFING HAYSTACKS.—Mr. G. Patterson, who read a short paper dealing with this subject, suggested the following plan for preventing mice from entering a stack:—"Obtain 20 to 30 poles, each about 5ft. long by 8in. thick. Char the posts in a fire to prevent damage from white ants, and put each post about

3ft. in the ground at equal distances over the area on which it is intended to build the stack. Next a number of kerosine tins should be obtained and the tops cut out, one piece of tin being fastened over the top of each post. The platform to carry the hay could then be built on the top of the posts. Care should be taken not to leave a ladder or any piece of timber leaning against the sheaves, otherwise the mice would be able to gain an entrance into the stack."

CHERRY GARDENS, February 19th.—Mr. F. Coleman (member of the Advisory Board of Agriculture) attended the meeting, and delivered an address, "Mixed Farming and Dairying."

MEADOWS, November 21st.—Mr. R. G. Morphett, of the Kangarilla Branch, attended the meeting, and read a paper, "Fruit Culture." (*See* page 614, January, 1924, *Journal*.—ED.)

McLAREN FLAT, January 17th.—Mr. G. Butler, of the Kangarilla Branch, attended the meeting, and delivered an address, "Poultry." Mr. Blair, a visitor from Adelaide, was also present, and spoke on the subject, "Chemistry of Sprays."

MOUNT PLEASANT, January 11th.—A general discussion on the feeding of dairy cattle, which arose from a paper read at a previous meeting by Mr. E. J. Tapscott occupied the attention of members. Several other subjects of local interest were also brought before the meeting for consideration.

MOUNT PLEASANT, February 8th.—A short discussion took place on the subject, "Machine *v.* Blade Shearing," all members expressing a preference for shearing with the machines. Information has been received from the Hon. Secretary (Mr. P. Haeusler) that the Branch has formed a course in wool classing, under the instruction of the Wool Instructor at the School of Mines (Mr. A. H. Codrington).

TWEEDVALE, February 21st.—Seventeen members and 10 visitors attended the February meeting, which took the form of a "Question Box." Twelve questions of local interest were submitted, which resulted in an instructive discussion.

SOUTH-EAST DISTRICT.

GLENCOE (Average annual rainfall, 33.84in.).

HAYMAKING AND STACK BUILDING.—Mr. Ferguson, in a paper on this subject, said an early sown crop of Algerian oats generally formed the hay crop in that district. He was of the opinion that a paddock of oats, seeded at the rate of 2bush. to the acre and drilled in with 100lbs. of superphosphate about the end of July, would produce a hay of far better quality than an earlier sown crop. Early sown oats, unless fed off to some extent, were inclined to grow coarse and rank, while the late sown oats grew a finer straw and made a much more palatable hay. Land intended for hay should receive particular attention in regard to cultivation at seeding time so that the oats could be cut close to the ground. Whilst he thought that Algerian oats made splendid hay and chaff, he had a decided preference for a mixture of wheat and oaten hay for chaff. He would not advocate sowing mixed grain, but advised putting load for load in the stack unless the farmer was cutting a large quantity, in which case the oats and wheat should be stacked separately. During the past seeding he mixed 8lbs. of black vetches with 1½bush. of oats per acre in his hay paddock, and whilst the exceptionally wet season prevented the vetches from making headway on the heavier soils, at the present time on the sandy soil they were as high as the oats, and had the appearance of dominating the oats because they were still growing vigorously. For dairy cows he believed that hay of vetches and oats would be the best. Much had been said and written with regard to the bitterness of Algerian oaten hay when cut green, but at the same time he thought that farmers very often went to the other extreme. He would cut his oats for hay when the heads had just taken on a slight creamy tinge; at that time the stalk was still fairly green, and if stooking was kept up about half a day behind the binder one gathered succulent straw and got a

fair amount of grain in the head. When commencing to cut the crop, he preferred going the reverse way first, *i.e.*, cutting from the fence and dropping the sheaves in the crop. On the completion of the first round one could turn around and take a width the other way when the sheaves dropped on the first round would be just outside of the grain wheel and could be quickly thrown clear; by the time another round had been cut stooking could commence. He thought that method would entail less work and waste than the other system of cutting around the fences when the rest of the paddock had been finished. He would make the sheaves fairly large so that a man could pitch them comfortably. Small sheaves used more twine per acre, and were also a waste of time from the stook to the chaffcutter. Twenty to 30 sheaves would make a fair sized stook; he preferred to make the stooks oval so that they would cure evenly and yet would stand firm in bad weather. He found that sheaves of average length, tied about 1ft. to 15in. from the butt, were better to handle than those tied nearer the heads. It was always worth while to take a little trouble in regulating the tying of the sheaves. When they became loose through the band slipping towards the head they were a continual source of annoyance. The length of time that hay should be left in the stooks before stacking varied with the condition of the crop when cut, and the weather. He thought that one could safely commence carting when the hay had remained in the paddock for a fortnight. He had commenced carting 10 days after cutting. If possible, he would build hay stacks east and west and open them for cutting at the east end. He had found that whilst dunnage would keep the bottom sheaves from getting damp it gave the mice an excellent opportunity to nest there and work upwards into the stack, therefore, a good thick layer of straw was to be preferred for a stack foundation. For stacks of 40 tons or 50 tons he thought that 4½yds. to 5yds. was sufficient width, and the length could be regulated as necessary. A narrow stack required less roofing and was more easily covered in case of rain. The higher the walls were made the more solid would the stack become, and there would be less opportunity for the mice to damage it. He built the inside courses of the stack with the butts out, but if the centre of the stack were always kept full he did not think it was of any consequence whether the heads or butts were placed on the outside. The main factor was to place the sheaves so that there was a slight dip outwards. Each course should be bound firmly with the succeeding one; that would ensure the stack having a slight spring, and a well sprung stack would not take in the rain. The outside course of sheaves should be built on edge and packed as closely as possible; all the other courses should be placed flat. He always put a double course of inside sheaves before commencing to roof, and then built the outside sheaves on the flat instead of on edge. In that district all haystacks should be thatched as soon as possible so that there was no need for a steep roof, but at the same time every care should be taken so that the outside sheaves would shed rain in case it should fall before the stack was thatched. In conclusion, he said members should be warned by the experience of the past autumn and winter to deal fairly with the stock by cutting a sufficiency of hay to ensure more than a starvation ration for the coming year.

KALANGADOO WOMEN'S (Average annual rainfall, 33in. to 34in.).

December 8th.—Present: nine members and visitors.

JAMS, JELLIES, AND PRESERVES.—The following paper was read by the President (Miss E. Hemmings):—"To make good jam do not have the fruit over-ripe, because this tends to make the jam 'squashy.' For most jams ¾lb. of sugar to 1lb. of fruit will be sufficient, but for very sour fruits, such as gooseberries, plums, etc., a little more sugar is needed. There are various methods of making jam Some people prefer to cut up the fruit, place sugar on the top, and allow it to stand over night, then pour off the syrup and bring to a boil and drop in the fruit. Others prefer to cut the fruit when ready to commence, and put sugar and fruit on the fire together. I have tried both ways and found them both successful. One of the main points to bear in mind is once the jam begins to boil, keep it boiling briskly, and as the scum accumulates on the top, skim it off. When the jam begins to settle, special care must be given to keep it well stirred from the bottom to prevent it burning. No set time can be stated as to how long the jam should be boiled, because this depends largely upon the kind and the conditions of the fruit and the quantity being made, also how quick a fire is used. Apples and quinces require enough water to come level with the top of the cut-up fruit

Melon Jelly.—Obtain 12lbs. fairly green melon, wipe and cut it up, but do not peel or remove the seeds. Three pineapples are necessary, and these should be washed and cut, but not peeled. Six lemons will also be needed, and some of the peel may be removed from the lemons if desired. This is gauged mainly by one's taste. Add about half as much water as is used for apples, because the melon is more juicy. Boil and strain as previously suggested, and return the pan to the fire, adding one cup of sugar to one cup of juice. When boiling, add a little tartaric acid and boil gently until finished. In making jelly, it will be found that most of the jelly qualities of the fruit are in the peels and seeds; this is why it is most important not to peel or seed. If one wishes to study economy, apple or quince jelly may be made from peels and cores alone. *Preserves.*—The fruit should be ripe but firm. Stoned fruit can be cut in ½in. squares and packed in jars, whilst the small fruits, such as prunes, cherries, &c., should be wiped, the stems removed, and dropped into the preserve. Peaches should be peeled, and may be sliced if desired. Pears, unless very large, may be peeled, cut in half, the core

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removed and packed. Make a syrup of 2lbs. of sugar to 1gall. of water. Allow this to stand until cold, then pour it over the fruit until the jar is full. Pack the jars in a boiler with straw to prevent them breaking and add sufficient cold water to come nearly to the necks of the bottles. Bring the water gradually to the boil, and boil gently until the fruit is cooked. Do not allow it to cook too much, otherwise it will not keep so well. Apricots need less cooking than most other fruits. Immediately the jar is removed from the boiler, put on a rubber ring and screw on the lid as tightly as possible. Turn the jar upside down, and if it leaks it is not air tight. Remove the lid and add another rubber ring. If this does not act, try another lid. It must be screwed so that it will not leak, or the fruit will not keep.''

REARING CALVES.—At a previous meeting Mrs. C. Campbell read a paper dealing with this subject. Calves, she said, should be reared from the best cows, but it was not advisable to rear a heifer's first calf. A calf could be more conveniently taught to drink if the animal were tied up, because the feeder had more control over it. It was a good plan to give the calf new milk for at least the first six weeks, especially if feeding with whey. The reader of the paper had found that calves did better on separated milk than they did on whey. If feeding with whey, it was advisable to add a little concentrated meal and new milk. To prevent scours, she said it was advisable to burn the milk with hot irons and add a little salt or lime. Rubber teats were used very considerably for rearing calves, and they seemed more natural than the fingers. Troughs and feeding utensils should be kept clean. It was a good plan to keep the calves shut off in a small paddock by themselves. The most profitable cows for dairying were the Jersey, Holstein, and Milking Shorthorn. Mrs. Campbell expressed a preference for the Milking Shorthorn. The Jersey was of rather a delicate constitution for the South-East. Cows should be provided with rugs during the winter months. A comfortable rug could be made from three wheat bags. Milking, if possible, should be performed at regular hours and done as quickly as possible. Each cow's teats and the milker's hands should be washed before milking. If a cow was hard to milk, the speaker suggested rubbing the teats between the palms of the hands. Heifers coming in on their first calf were very subject to swollen udders. A good remedy for that was to bathe the udder in warm soapy water before milking. If dairying was undertaken seriously, one should have the cows tested at least once a week. It paid better to feed one cow with a good test rather than two showing lower yields. The feeding of the cows was a very necessary practice, especially during the winter months. The cows should be fed twice a day on oaten chaff, bran, and a ration of green fodder. She had found it a good plan when feeding chaff to scald the fodder and allow it to stand all day. Molasses could be added with advantage. Sudan grass, lucerne, or maize and bonemeal, and an abundance of fresh water, would prove beneficial to the animals during the summer months.

KONGORONG.

January 22nd.—Present: 11 members and visitors.

Mr. F. C. Caine read an article, ''Poa Aquatica,'' and an interesting discussion followed.

DAIRYING AND ALLIED INDUSTRIES.—In the course of a paper, under the title ''Advice to the Beginner in Dairying,'' which was read at the November meeting, Mr. C. Dixon said in using the term dairying he meant that to include the raising of pigs and poultry. He believed that in the course of a few years the districts that were within a comparatively short distance of the city would be called upon to supply the metropolitan areas with a greater quantity of dairy produce than they were doing at present. A feature of dairying was that much that was taken out of the land was returned to the soil in the form of manure. If the cows were properly handled, quick and constant returns were assured. Now that overseas freights had been considerably reduced, the time was ripe for South Australia to establish an export trade in pig products. Probably one of the mistakes that the beginner in dairying would be likely to make in the stocking of his holding would be that of attending the open stock markets and making purchases irrespective of the breed or type of cattle that he selected. The better plan was first of all to decide on the breed that was most likely to suit local conditions,

and then rigidly adhere to it. A few animals should be obtained from the herds of reputable breeders, and if it were not possible to obtain sufficient animals for immediate requirements the beginner should be content to commence with the best animals with the means at his disposal, and await an opportunity to obtain pure-bred animals. Care should at all times be exercised not to overstock the holding. Only the services of a pure-bred sire should be used with the herd, and the matings should be so regulated that the cows would return an uninterrupted flow of milk right through the year. One of the most important factors in the success of the dairying industry was to provide for an adequate supply of fodder. For early green feed the speaker recommended Cape barley, and for winter feed oaten chaff with crushed grain. For summer fodders, kale, chou moellier, millet, and mangolds would give good returns. Half of the ration fed to dairy stock was utilised in the maintenance of the animals, and it was to the other portion of the feed that the dairyman looked for production and profit. The ration should contain a liberal amount of concentrates in the farm of bran, crushed oats, or barley, and feeding would be carried out to the best advantage if the ration for the cows were weighed or measured. Keeping the stock in comfortable paddocks by supplying them with shade and shelter would, the speaker said, do much towards aiding production and reducing the cost of the feed bill.

NARACOORTE (Average annual rainfall, 22.60in.).

December 8th.—Present: 10 members.

SOUTH-EASTERN TIMBERS.—In the course of a paper dealing with this subject, Mr. J. Corner said there was a large demand for all classes of locally grown timber at the present time, and good prices could be obtained for it. The local red gum

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was always in demand for sleepers for railways and blocks for street paving. It was an excellent timber for the construction of bridges. Another fine timber was the South-Eastern blue or white gum. It was superior to the red gum for building purposes, and made very good weatherboards and floorings, being close grained and free from splinters. When properly seasoned, stringy bark could be used for many purposes, such as furniture manufacture, buildings, and fencing posts. The Hill gum was a very useful timber, and there was an excellent outlet for it at good prices. Mr. J. Donoghue referred to the usefulness of stringy bark, but it was, unfortunately, disappearing very rapidly. Mr. W. E. Rogers said red gum could be planted to advantage in the Naracoorte district, and it made excellent fencing timber. Mr. A. B. Feuerheerdt said the question of afforestation was one which should be of interest to every one in Australia. Australia had the finest hardwood timbers in the world, but it was very regrettable that so little was done to keep up the supply, the great fault being that no systematic steps were taken to preserve the forests. Another good timber that was quickly vanishing was the sheaoak.

PENOLA (Average annual rainfall, 26.78in.).

February 2nd.—Present: 11 members and visitors.

TOP DRESSING PASTURES.—In the course of a short paper dealing with this subject, Mr. S. Ockley expressed belief in the value of top dressing pastures and growing fodder crops, such as Sudan grass, Japanese millet, and chou moellier, to carry stock over the autumn months. Members were disappointed with the results obtained from Sudan grass, it being generally agreed that the poor crops were the result of bad germination. Mr. Adamson thought that immature seed would possibly account for the poor germination.

RENDELSHAM.

December 19th.—Present: 15 members.

RABBIT DESTRUCTION.—The rabbit was one of the greatest pests that farmers had to deal with. It was not only very destructive, but ate the choicest grasses, said Mr. W. R. Galwey, in a paper dealing with the above subject. The problem that confronted the landholder was how effectively to deal with the rabbits. Poisoning, he considered, to be a waste of time, but thought cultivation and trapping the surest method of control. In the discussion that followed, Mr. W. Andrews stated that the first work in clearing the rabbits off a property was to subdivide and net the paddocks, and wherever possible to plough in the warrens with a disc plough. Then when the paddock was cleared a few traps and dogs would destroy the stray rabbits. Mr. H. Stewart expressed a preference for fumigating the burrows. Mr. W. Foster held the opinion that if a Government inspector were appointed, and the Vermin Act strictly enforced, the rabbits could be easily destroyed.

TANTANOOLA.

January 11th.

IRRIGATION.—In the course of a paper dealing with the utilisation of the water that was at the present time running to waste in the district, Mr. R. Campbell contended that much land that was idle and dry during the summer and early autumn months could be put under intense culture with the aid of water pumped from the adjacent drains or, where the drains did not exist, from the spring waters that were within easy reach just below the surface. The district was noted for its suitability for dairying, and there was apparently no reason why, with the use of water and fertilisers, the carrying capacity of the land could not be increased manifold. In favorable seasons that locality had produced maize 13ft. in height, and mangolds had been grown estimated to yield 100 tons to the acre; but those object lessons of the past appeared to have been obliterated by

a succession of successful barley years. An experienced irrigationist and successful dairyman who recently visited that district thought that much of the reclaimed land would yield 80 tons of maize to the acre under irrigation. Some years ago Mr. C. Kiely carried out some experiments which were most successful, but the high cost of petrol and the want of a market for tomatoes deterred him from continuing operations. In Victoria many country districts supported sauce and jam factories, and much of their produce found its way to the South-East, and there was no reason why that district, which was so well supplied with water and suitable land, should not be able to compete with the other favored districts in Australia. There were thousands of acres of adjacent lands that would grow excellent export apples with or without irrigation, and about 100 miles of railway connected them with Portland, a favorable overseas shipping port.

TANTANOOLA.

February 2nd.—Present: 13 members.

CLOVERS.—The following paper was read by Mr. J. Carthew:—"The trifolium family consists of quite a number of species, and whilst differing in many respects, they, as the name indicates, are all three-leaved, and constitute a subject for study full of interest and possibilities. Most of the family find congenial conditions in the temperate climates of Europe and in the moister districts of Australia, and this district should be no exception to the general rule. As a first-class dairy pasture clovers take a very high position, and more attention should be given them in the South-East. Care should be exercised in making the best selection suited to the locality, and evidence is now being collected from local experiences and natural conditions which should be helpful to landholders. The clovers of most popular repute in the clover-growing districts of Australia are as follows:—White Dutch, Alsike, Suckling, Crimson, and Red clover. There are two varieties of Burr clovers, and four varieties of Melilotus, both of which belong to the family Leguminosae. Birdsfoot and the black-seeded trefoil are both adapted to this district, and recent experience demonstrates that Strawberry and Subterranean clover are likely to play a most important part in reclothing our arable lands, the former on the wetter and the latter on the drier sandy rises. One of the best known is the White Dutch, which does well in this district. It resembles the Strawberry, inasmuch at it extends by underground stems, but where stock have access to it continuously it does not have an opportunity to extend itself. It is perennial when once established. Strawberry clover does best on the low-lying damp land, and finds a congenial home in the reclaimed water courses, cleared ti-tree land, and in the heavier peaty soils, all of which abound in this district. It is abundant on the roads, where it finds congenial conditions, and landholders are giving it more attention than ever before, and where established it is given an opportunity to mature its seed. As it comes late, it blooms late, and it is green when most other feeds are dry. This fact points out its value as pasture in a dairying district. It is a rich milk producer, and where stock have continual access to it they keep it so short that this alone supplies strong evidence as to its palatability. For this reason it should be given a spell when flowering time approaches until the seed is matured. Given this consideration there will be no question as to its area being extended at comparatively little cash outlay. As a result it becomes permanent when once established. Seedsmen recommend this variety for heavy land liable to crack in the summer time. Many of the clover family are not only good pasture plants, but also make good hay. Subterranean clover is suitable for the higher and drier sandy and stony rises, of which there are considerable areas in this district, and reports say that much of this class of land will be sown to it this season. To give it its best chance, it should be sown with the first rains and not later than April, *i.e.*, unless sown with a cover crop, and then the earlier the better. When green, it forms a first-class pasture for sheep and cattle, and has the great advantage that it is a winter grower. Subterranean clover has the reputation of causing bloat in cattle, but this can be avoided by not turning the stock on to it when hungry, or when the feed is wet, or by not leaving them on it for lengthy feeding periods. My own experience with Burr clover this season is favorable. The plot consisted of about 10 acres of self-sown crop on land where oats had preceded. The stock were shut off from it during the depth of winter, and it then gave an abundance of feed.

It is a splendid green pasture in the spring, and, when dry puts both cattle and horses in prime condition. Evidences from other districts support my experience. The best knowledge of these plants is to be obtained by going about the district and noting where they grow, and which varieties do the best in the particular soil in which they grow. All clovers are soil improvers, and the fact that they are mostly appreciated by stock makes the extension of their cultivation highly desirable. Generally they grow better on land that has been cultivated."

"STRAWBERRY CLOVER."—The following paper was read by Mr. R. Campbell:—"There appears to be a good deal of confusion in the minds of many in confounding Strawberry clover (*Trifolium fragiferum*) with Subterranean clover (*Trifolium subterraneum*). The latter is generally recommended for sandy and dry soils subject to a good rainfall, but it will not stand inundation. It buries its seed pods in the soil and bears a small white flower with a crimson blotch at the base of each flower, whereas the Strawberry clover is perennial, and when once seeded under congenial conditions will last a lifetime. It has a shaded crimson flower head of oval shape, and its seed head is of the same shape on an upright stalk. It will grow in very wet ground, and will even stand many months of inundation without serious detriment. It will grow on high and dry land, but does not show anything like the same growth as when sown on wet land, especially if the latter be a reclaimed ti-tree bottom. It does well on heavy black land subject to cracking in the summer time. Like all other trefoils it responds liberally to a generous dressing of bone or other super. There are many places in the district where the plant is to be found, but principally on roads, where it has probably been introduced by travelling sheep. It has been confused with the small pink flowering clover so abundant on the roads this season, but there is actually no similarity in the two plants, except that they are both clovers. This particular variety has a distinct woolly seed head, and thus derives its name (*Trifolium tomentosum*) therefrom. It, too, like the Subterranean, is an annual, and there are evidently two varieties of it, because there is a slight difference in the seed head, one having yellow, and the other brown or black seeds. Strawberry clover was introduced to the district by the late Mr. Thomas Williams, of Moorak. The plant is readily propagated by heeling-in single pieces of the runner bearing a joint, more substantially from pieces of sod in which the plant is growing, and from seed, but unless the conditions are specially favorable, the plant does not make much headway during the first season from sowing. Solitary plants when established will so extend themselves that in a few years if not fed too closely they will cover an area several feet in diameter. For those who have large areas which they are desirous of sowing to this plant, and do not care to spend as much in seed as it would require, a good plan is to sow a fair sized paddock, let it come to maturity and ripen its seed, turn sheep on it for a day of two, then turn them over the larger area. There are many thousands of acres in the South-East, from Kongorong to Lake Hawdon, Lucindale, Penola, and Naracoorte, where the plant will thrive under the abundant rainfall, of which the district sometimes has too much, but not for Strawberry clover."

ALLANDALE EAST, February 22nd.—Mr. A. Kieselbach, a member of the Mount Gambier Branch, attended the meeting, and delivered an address dealing with various subjects of local interest.

FRANCES, January 26th.—The subject, "Rinderpest in Cattle," was brought before the meeting, and a lengthy and interesting discussion resulted.

KONGORONG, February 18th.—Fourteen members attended the monthly meeting of the Branch, when the matter of fencing the local experimental plots was brought before the meeting for discussion.

WIRREGA, February 12th. The manager of the Kybybolite Experimental Farm (Mr. L. J. Cook) attended the meeting, and delivered an address, "Subterranean Clover."

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

No. 9. APRIL 15, 1924. VOL. XXVII.

Published Monthly by the Department of Agriculture.

Edited by H. J. FINNIS.

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All communications to be addressed:
"The Editor, Journal of Agriculture, Victoria Square, Adelaide."

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JOHN COWAN,
Minister of Agriculture.

POINTS FOR PRODUCERS.

Fruit Fly.

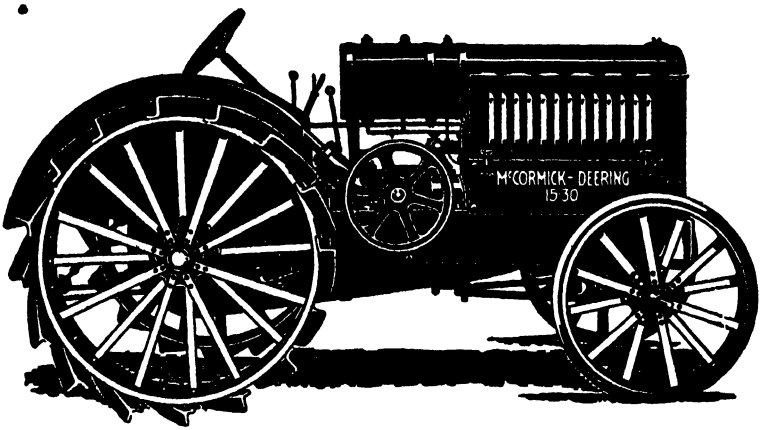
The existence of the Mediterranean fruit fly in States neighboring South Australia constitutes an ever present source of possible infestation, and from time to time no little public alarm is caused by the appearance of the pest so near the State's borders as to present an imminent menace to the fruit industry. Whilst these periodical scares are not without their value as a means of impressing on the public the need for the utmost care if this and similar insect pests are to be excluded from the State, it is reassuring for them to know that the Horticultural Branch of the Department of Agriculture has for many years maintained an unceasing vigil to that end.

To protect the industry in this State, the introduction of fruit from States which already have this pest in their orchards is restricted to certain "places of entry" where inspectors are on the lookout. The great bulk of the fruit imported in South Australia arrives by sea at Port Adelaide or by rail at Mile End. At both of these places the Horticultural Branch of the Department of Agriculture has established depots, and all consignments of fruit are immediately transferred from boat or train to one of these depots, where they are put through a stringent examination, and, if found to be infected, are held in strict quarantine. An additional safeguard lies in the fact that no fruit is admitted from another State in which this particular fruit fly is established in the orchards unless it is accompanied by a certificate, signed by an Inspector of Orchards stationed in the district where the fruit is grown, declaring that the orchard in question and all the land within five miles of that orchard are absolutely free from the Mediterranean fruit fly and have been so for a period of at least two years prior to the date of the signing of the certificate.

Subterranean Clover.

Known for a long period as a roadside weed in Central and Southern Europe, subterranean clover has in certain parts of South Australia recently proved to be a valuable fodder. It has revolutionised the farming practices of some districts of the State, and has converted many farms, on which it has been difficult to make profits by other means, into valuable sheep propositions. To meet the growing demand for information with respect to this fodder, the Department of Agriculture has issued a bulletin, in which the author, Mr. W. J. Spafford (Superintendent of Experimental Work), describes the plant, details its climatic and soil requirements, and explains cultivation practices and methods of handling it.

By way of preface, Mr. Spafford pays a tribute to the efforts of Mr. A. W. Howard, of Mount Barker, South Australia, to popularise the plant. "The credit for discovering, proving, and giving publicity to this really important fodder is practically wholly due to Mr. Howard, whose efforts for a period of more than 30 years in this direction are now being appreciated in all of the States of the Commonwealth and in many other countries of the world," he says.



McCormick-Deering Tractors.

THE McCormick-Deering Tractor is well adapted to farm work. It is equipped with a vertical 4-cylinder valve-in-head engine, which operates economically on kerosene and other low-priced fuels. The cylinders are cast separately and fitted into the engine block, so that they may be easily removed and replaced in case they become scored or worn. The Tractor is equipped with high tension magneto, with impulse starter, has a throttle governor, and the principal bearings throughout the entire machine are roller and ball. A belt pulley of large diameter on the right side of the machine is conveniently placed for belt work, and can be started or stopped from the driver's seat, independent of the engine. Three forward speeds, 2, 3, and 4 miles an hour, and reverse.

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After discussing the botanical characters of the plant, Mr. Spafford explains that in South Australia the seed germinates with the first autumn rains which are heavy enough for the purpose, and which usually occur in April or early May. The young plants make some growth during the winter period, and by the end of August will have produced a thick mass about 4in. in height. When the warm weather of spring arrives they grow very rapidly, and remain green and continue growing until really hot weather is experienced, after which they dry up. This characteristic of slow growth in winter, rapid growth in spring, and maturing when hot weather is experienced means that full returns from this clover can only be secured in those districts having a long spring period. In South Australia most of that part of the country which has an average annual rainfall of more than 20in. has a sufficiently good climate to grow subterranean clover well. It will withstand a fair amount of excessive wet and the ordinary cold of winter, hence maximum results are secured in those districts with an annual average rainfall of from 30in. to 40in. and a growing period of about nine months between the autumn rains and the really hot, dry weather of summer, providing always that the seed germinates before the cold weather of winter arrives.

Subterranean clover appears to be able to accommodate itself to almost all types of soil, and given suitable climatic conditions and sufficient phosphoric acid will grow well in calcareous and in sour soils, in most clay soils, in all sands, and in peaty soils, but gives best returns in good, well-balanced loams possessed of good, natural drainage. In this State one of the few types of soil in which the clover does not thrive well is the black, clayey soil forming part of some of the "crab-hole" land of the South-East, but the extent of the country containing this soil type is so limited that it is not worth much consideration. Much of the value of this clover depends on the fact that, provided phosphoric acid is supplied to the soils, it will grow extremely well on really "sour" soils, whether they be poor, whitish sands, clayey soils containing much ironstone, or really fertile loams. The poorer types of "sour" lands are usually fairly plentiful where heavy annual rainfall and temperate climate are the rule, and it is not an easy matter to produce profits from the ordinary well-known crops on such soils, but subterranean clover flourishes in them to the exclusion of practically all other plants.

The bulletin referred to deals exhaustively with cultural practices. By way of summary it may be mentioned that the seed should be sown in time to germinate before the cold weather of winter sets in. It may be drilled into the soil or broadcasted on the surface and then worked into the land, but shallow seeding is essential. Good soil preparation is necessary if a proper stand is required in the first year, but the seed can, under some circumstances, be sown with another type of crop or drilled into "grass" land without previous cultivation. For a full crop 6lbs. of seed should be used. If it is put in with a cereal crop 2lbs. will suffice, and when seeded into soil not previously prepared 4lbs. to 6lbs. will be needed. Mr. Spafford emphasises the fact that it is almost impossible to grow subterranean clover well in soils of districts with temperate climates unless plenty of phosphoric fertiliser is used. For high returns he considers the

equivalent of 2cwts. superphosphate (36 per cent.) per acre per year should be applied. At present, the application of 1cwt. superphosphate (45 per cent.) and 10cwts. finely ground raw rock phosphate (82 per cent.) per acre once every 12 years is possibly the cheapest way to apply the phosphoric acid. All manuring should be done in the early autumn. It is stated that the clover can be used with advantage to livestock, when green, as hay or as "dry" feed. It is a good soil renovator, collecting nitrogen and increasing the organic matter content of the soil, and a good soil cleaner, choking out most of the ordinary farm weeds.

The "Salt Cure" for Woolly Aphis.

The contention that applications of crude salt to the soil in the neighborhood of apple trees would effectively control woolly aphis has been put to the test in the Government Orchard, Blackwood, this season by the Horticultural Instructor (Mr. Geo. Quinn). Trees were treated with dressings of salt, varying from 4lbs. to 14lbs. According to the Manager of the Orchard (Mr. R. Fowler) the trees are still badly infested with the aphis, and they are now rather sickly in appearance, due probably to the combined effects of the aphis and the salt. It is also noticeable that the fruit is falling more readily from trees which have been subjected to the salt treatment than those untreated.

Veitch Experimental Farm.

The Government Experimental Farm, Veitch, is situated in the hundred of Allen, 158 miles from Adelaide, on the Loxton railway. It consists of about 3,800 acres of land, the bulk of which is sandy, the remainder running to shallow, light loam soils overlying hard limestone rock—conditions similar to thousands of acres of surrounding country. Since 1909 the average annual rainfall recorded on this farm was 13in. For the same period the average "useful rainfall" (April to November) was 9.66in. During the season just closed, however, the rainfall was 13.33in., and the fall of "useful rain" 11.75in. The cereal yields for the season were considerably above the average.

In commenting on the cropping, the Manager of the Farm (Mr. L. Smith) states that the bulk of the area seeded was put in dry during April and May. Good germination resulted after the first rains on May 6th. Heavy winds during June and July, which caused a sand drift and cut the young crops in some parts, and a dry October, reduced the yields somewhat. The hay cut for the season was taken from 71.54 acres sown with Cumberland, Baroota Wonder, Late Gluyas, and King's Early wheats. From this area a total of 150 tons of hay was cut, the average working out at 2 tons 1cwt. 105lbs. per acre as against an average for the farm for the past 14 years of 1 ton 2cwts. 20lbs. Of oats, 116.59 acres were harvested for grain. These were sown on fallow at the rate of 40lbs. of seed per acre, with 1cwt. of superphosphate. Seven varieties were grown, the average yield being 18bush. 24lbs. as compared with an average for the past eight years of 17bush. 30lbs. The yields of the individual varieties were as follows:—Scotch Grey, 29bush. 24lbs.; Early Burt, 23bush. 39lbs.;

Rua Kura, 22bush. 4lbs.; Kelsall's, 18bush. 18lbs.; Algerian, 15bush. 28lbs.; Kherson, 12bush. 16lbs.; Lachlan, 9bush. 33lbs. Mr. Smith is of the opinion that of the varieties tried on this farm Early Burt and Rua Kura are the most suitable for the district, for the reason that they can be harvested and cleaned up out of the way before the other cereals are ripe. Scotch Grey has proved a good and consistent grain yielder, but is rather short in the straw for hay purposes. The barley crops harvested for grain, 78.47 acres, were grown on fallow land. The grain was sown at the rate of 50lbs. to the acre, with a dressing of 1cwt. superphosphate. The average yield was 23bush. 38lbs. as compared with 16bush. 50lbs., the average for the past nine seasons. Wheat was grown on fallow and on "new" ground. The fallowed land was seeded with 60lbs. of grain and 1cwt. superphosphate per acre, and the "new" land with 60lbs. of seed and 75lbs. of superphosphate. In all 23 varieties were grown, the average yield being 17bush. 24lbs. The average wheat yield of the farm for 15 years is 11bush. 19lbs. The varieties which yielded 15bush. or more per acre are:—Sultan, 25bush. 34lbs.; Walker's Wonder, 24bush. 29lbs.; Red Russian, 23bush. 15lbs.; Maharajah, 20bush. 25lbs.; Canaan, 20bush. 6lbs.; Triumph, 19bush. 1lb.; Queen Fan, 18bush. 28lbs.; Rajah, 17bush. 43lbs.; Gluyas Late, 17bush. 9lbs.; Cumberland, 16bush. 41lbs.; Gluyas Early, 15bush. 21lbs.; Caliph, 15bush. 1lb. These, with Baroota Wonder, are, in the opinion of the Manager, "worth a place on any mallee farm."

The experimental work being conducted on this farm includes:—(*a*) A series of manurial plots with wheat being worked on the following rotation:—(1) Pasture; (2) bare fallow; (3) wheat. (*b*) Plots designed to test different methods of cultivating bare fallow for wheat, and worked on the following rotation.—(1) Pasture; (2) bare fallow; (3) wheat. (*c*) Manurial and cultivation tests with six-rowed barley. (*d*) Quantitative seeding tests with wheat and barley.

Success with a French Barley.

With the object of introducing into this State varieties of barley likely to prove more profitable than those generally grown, the Department of Agriculture in 1921 imported seed of different sorts from New Zealand, Great Britain, and France. These were sown at Millicent during the 1922 season, and portion of the grain grown there was made available to South Australian barley growers. Amongst those who secured seed of one type—the French variety, "Albert"—was Mr. S. J. Binney, of Glencoe East. Mr. Binney sowed one bag of this variety, and in a communication recently received by the Department of Agriculture he commented on the crop as follows:—"The barley did remarkably well, making good, strong growth. It was up to my shoulders and was much admired by all who saw it. When it was cut for threshing it took over three balls of twine for the three acres. One bag of grain yielded 41 bags of barley, approximately 45bush. per acre. The total yield was 135bush. Some of it was cut on the green side to save it from the caterpillars. Duckbill growing alongside only yielded 35bush. per acre, and I estimate the Albert would have yielded 50bush. had it

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Has been thoroughly tested, and proved the best variety for Australian conditions!

Berseem Clover is the King of Winter Fodders, the heaviest yielder, and altogethe a sound business proposition. Every farmer should have a crop. Can be pastured cut for green feed, or made into hay. Cleanses the land, as the cutting destroys the weeds, and can be ploughed in for green manure. Unequalled as a predecessor to lucerne.

MORE REASONS FOR SOWING BRUNNING'S GENUINE "MESGAWI"

1. Grows in Winter like Lucerne in Summer
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4. A splendid Winter Fodder for dairy cows, and does not taint milk.
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not been attacked by caterpillars. I had a bag crushed for pig feed, and it exceeded my expectations in the crushing by yielding better meal than Duckbill." Mr. Binney further mentions that he proposes to grow Albert in place of Duckbill for his pigs during the coming season.

Planting Fruit Trees.

For a number of years past the Horticultural Branch of the Department of Agriculture has carried out tests in the experimental orchards with the object of determining the best time of the year to transplant deciduous fruit trees. These tests show that in the average season there is a decided advantage to be secured by transplanting trees and vines into their permanent positions in the early autumn season, even though it may be necessary to lift the plant from the nursery before the leaves have fallen to any extent. The exception is when the rainy season occurs later than usual. Records indicate that the soil temperature has a tendency to fall much lower when the ground remains dry until May and June, consequently, trees and vines transplanted under such conditions do not make new growth to take the place of roots broken at the time of removal from the nursery. These trials have revealed that whereas the leaves may drop from the trees after transplanting takes place, the root system will start into activity and produce quite a strong growth before the ground becomes too cold, although no evidence of this growth is detectable on the plant above the ground. The extent to which this operates can be gauged from the fact that one young Cleopatra apple tree transplanted in May under favorable conditions produced over 460in. of new root growth within a period of eight weeks.

Fruit Export.

Up till the middle of March the Inspectors of the Horticultural Branch of the Department of Agriculture, who are also Examining Officers under the Commerce Act, dealt with 36,528 cases of apples and 15 cases of pears for export. In general the fruit was of excellent quality, clean and free from disease, but, unfortunately, several thousands of cases have been rejected, and have either to be marked down in grade or to be resorted before being shipped, because some growers have neglected to make themselves acquainted with the requirements of grading regulations. They have submitted apples varying between 2in. and 3in. in diameter in one case, which is in contravention of the regulation which requires uniformity of size of fruit within the range of ¼in. in any one case in any grade. From the point of view of quality, however, it may be stated that amongst the consignments there have been instances where a good deal of the fruit which was branded "standard" might well have been classed as "special," which is the highest grade. The Horticultural Instructor (Mr. Geo. Quinn) remarked that the fruit being exported is very typical of the quality of the apples which are to be seen throughout the State this season, and it is very unlikely indeed that anything coming under the more recently declared grade "blemished" will be exported from this State.

POWER FARMING

The Question of the Hour.

Below we give a further list of questions put to us by farmers, and our replies are added thereto.

***Question**—What advantage and what profit may I expect to gain from the use of a CASE Tractor?*

Answer There are many different ways in which a farmer gains material advantage by the use of a CASE Tractor:-

1. Timeliness.
2. Better work.
3. Increased farming capacity.
4. Belt work.
5. Contract work.
6. Releasing of land for stock raising or marketable crops.
7. Cheaper production.

The CASE is within your reach.
Read the last question.

***Question**—I know it is a big item, but if I got rid of a 12-horse team what would I save in feed?*

Answer In the first place, what does it cost to feed a horse? Many farmers say, at least, £30, but let us take it at £20. That means a saving of £240 per year. On top of that, how many hours a day does it take you or your man to water, feed, yoke, and unyoke that team? Farmers throughout the country say four would be a very low average. That four hours represents one-third of a man's working day. If his wages (including board and lodging) are 80s. per week, the value of the time spent in attending to those horses is 4s. 5d. per day, or a sum of £57 8s. 4d., covering a working period of 260 days. This makes a total of £297 8s. 4d., or an expenditure of £5 14s. 4d. per week.

***Question**—But is that part of a man's time saved if I use a CASE Tractor?*

Answer The time now wasted in feeding, &c., is saved by reason of the fact that the man would be occupied working the Tractor on the land, which is a more remunerative operation than feeding.

Here's an important message from the user of a

CASE

Kerosene Farm & General Purpose Tractor

THE following figures have been supplied by a South Australian farmer. They relate to his working costs of a year's operations, in heavy country, with a 15/27 CASE Tractor, which replaced 12 horses.

SUMMARY OF YEAR'S WORK.

Kind of Work	Quantity.	Time.	Fuel Used.	
	Acres, &c.	Hours.	Kero.	Petrol.
Cultivated..	814	203¾	428	12½
Fallowed ..	361½	148¾	309½	9¾
Cultivated..	728	201¾	318½	11
Reaped	2,810 bags	211¾	288½	11½
Cultivated...	283	74½	109	3½

Total Cost of Fuel and Oil, £137 10s.

No repairs were required.

Included among the innumerable unsolicited testimonials we have received from CASE Tractor users all over Australia, may possibly be the experiences of farmers who have had to contend with conditions similar to those on your farm to-day. You can get the benefit of these experiences from our Book of Testimonials, Post Free on Application.

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BRANCHES IN ALL STATES.

POWER FARMING

The Question of the Hour.

Question—Is fuel Cheaper than horses?

Answer Read the testimonial on the opposite page. Then figure it out and see if you could do the same work with your horses for the same cost.

Question—Is it necessary for me or my man to be motor experts in order to drive a CASE?

Answer Most farmers to-day have some knowledge of mechanical appliances. The CASE is so simple to operate that its mastery is only a matter of a few hours. But the CASE Service Organisation sees the Tractor and its driver started right and kept right.

Question—Will the CASE Tractor do my belt work?

Answer *Farmer's Bulletin* 1093, of the U.S. Department of Agriculture, points out that the following operations are being profitably performed by Tractors:—Threshing, hulling, elevating grain, shredding corn, shelling corn, filling silo, baling hay, sawing wood, operating saw mills, cider mills, feed grinding, pumping water, mixing concrete, hoisting hay, pulverizing lime, and drilling wells. Whilst some of these operations may not be conducted in Australia, they nevertheless show the large possibilities of the Tractor as a source of power for farm work, as well as its adaptability for a large variety of other uses. The CASE Tractor is the only power machine needed on the farm.

Question—Can I obtain a CASE Tractor on terms?

Answer Yes. Further information and copies of unsolicited testimonials may be obtained by writing to

Commonwealth Agricultural Service Engineers, Ltd.,
RICHARDS BUILDINGS, CURRIE STREET, ADELAIDE.

Watch for fresh Questions and Answers in next issue.

You, as a farmer, need cheaper production.

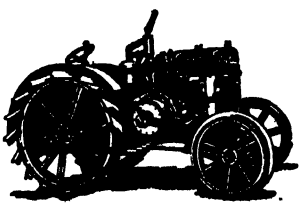
Investigate the merits of the

CASE

Kerosene Farm & General Purpose Tractor



CASE Tractors are made in four sizes; there is one to meet your requirements.



THERE is no doubt that the CASE Kerosene Tractor in all operations - Fallowing, Cultivating, Seeding, Harvesting, Hauling, and Belt Work reduces costs. It works at small expense and can keep on going while there is work to do, thus taking full advantage of all favorable weather conditions. With all implements the CASE is a one man job.

The CASE Tractor has many superior features, because it is built specially for the job. Let us tell you more about it. Write us for Catalogue and Booklet of Testimonials.

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BRANCHES IN ALL STATES.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Replies supplied by MR. ALAN H. ROBIN, B.V.Sc., Veterinary Officer, Stock and Brands Department.]

"C. W. J Lowalde, has light mare, 7½ years old, with a hard lump on hind fetlock on the outside of the joint.

Reply—It is doubtful if you will be able to get your mare thoroughly and reliably sound. The most likely treatment to produce desirable results would be to clip the hair over the lump and rub in for 15 minutes a good red blister of strength 1 to 8. A day or so after turn her out for a spell. It may be necessary to repeat the blistering in four to five weeks' time. In order to afford the best chance of recovery it is essential that she be spelled for several weeks during the treatment.

"D. A. S.," Milne, asks treatment for horses with sore shoulders.

Reply—Sore shoulders frequently take a good deal of time to heal up, though, as a rule, they are amenable to treatment. You should bathe them in a 1 per cent. solution of lysol in warm water, and if any of the lumps contain any matter they should be lanced and the matter allowed to get out. Then dress with a fairly strong solution of common salt in water. To assist healing, keep the horses' blood in good order. Give them an occasional handful of Epsom salts in a sloppy feed, or a bran mash, and give each animal 1oz. of Fowler's solution every day for 10 days.

Hon. Secretary, Miltalie Agricultural Bureau, asks why is it necessary to keep rams away from ewes for some days after dipping?

Reply—It is wise to adopt this procedure to prevent sexual intercourse between the rams and the ewes taking place before the fleece has had a chance to dry out after the dipping. If mating occurs while the fleece is dripping wet with the liquid, some of it may, through contact with the ram, be introduced into the genital passages of the ewes and set up considerable irritation and inflammation. It may similarly cause trouble if it gets on to the uncovered pizzle of the ram.

"O. J.," Hamley Bridge, has young pigs fed on skim milk and barley which have developed lameness in front legs and stiffness in hindquarters.

Reply—It is probable that the change of feed consequent upon their change of quarters is affecting the pigs. Make sure that their sties are clean, dry, and warm, and give shelter from winds. Reduce the ration somewhat and feed more on green food slops for a week. Put Epsom salts in the food occasionally, at the rate of one packet per pig, and add 10 to 20 grains of calcium sulphate per pig to the feed night and morning.

"R. H. O.," Clinton Centre, has a mare with gathered udder. The udder is quite hard, and a boil has developed in the lower portion of the leg.

Reply—Commence treatment by giving the mare 1lb. Epson salts in a drench. Keep her on light diet—sloppy food, with a handful of Epsom salts mixed with it, night and morning. If green feed is available in any form it will be very

helpful. Water the mare from a bucket, and dissolve 1oz. of hyposulphate of soda in the water daily. Local treatment to the udder consists of keeping it thoroughly clean; foment frequently with hot foments and gentle massage so long as it remains at all indurated. Provide drainage for any matter that forms, and syringe out the abscess cavity daily with a solution of iodine 1 part, potass. iod. 3 parts, boiled water 100 parts.

Hon. Secretary, Agricultural Bureau, Shoal Bay, asks is smutty wheat injurious to stock.

Reply—Smutty wheat, if fed to stock, is liable to produce gastric and intestinal disorders.

A. W. W," Parilla, asks:—(1) Suitable lick for horses and cattle; and (2) remedy for horse with fleshy growth in corner of eye.

Replies—(1) A suitable lick for horses and cattle may be compounded as follows:—Common salt, 12 parts; ground bone meal, 6 parts; superphosphate, 6 parts; powdered sulphate of iron, 1 part. (2) Your horse has a growth in the corner of the eye which is frequently erroneously called a cancer. There is only one treatment for it and that is operation. If your horse is at all valuable you should obtain the services of the veterinary surgeon at Pinnaroo to perform the operation, which is not very difficult nor serious if attempted before the growth becomes too big.

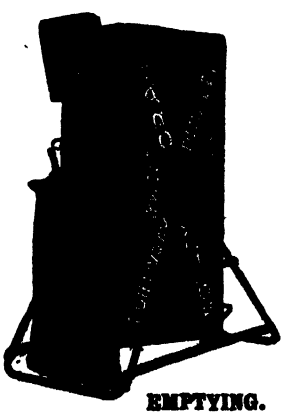
Hon. Secretary, Rapid Bay Agricultural Bureau, asks for a suitable dressing for making hair grow on a horse with broken knees.

Reply—As a rule, when a horse suffers from the disability of broken knees, the natural skin and hair follicles over the parts are destroyed. The scar which remains after healing is not normal skin and does not contain any hair follicles, consequently there is no remedy of any avail to promote growth of hair to cover up the blemish.

The Improved McGillivray Patent Rotary Grain Pickler.

WET OR DRY.

AS USED BY GOVERNMENT EXPERIMENTAL FARM.



EMPTYING.

That ensures every grain is WELL RUBBED in pickle. No need to worry, you cannot over or under pickle, as you have the same QUANTITY and STRENGTH to every bag (3 quarts), not gallons. The only pickler to do this.

This machine is always clean, and ready to put away when finished pickling.

No high lifting of bags—2ft. 6in. at most. A lad can operate it, and pickle thoroughly 18 or 20 bags per hour. For speed, efficiency, economy, and simplicity, this machine stands alone.



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AGRICULTURAL ENGINEERS.

ROSEWORTHY AGRICULTURAL COLLEGE HARVEST REPORT, 1923-1924.

[By W. J. Colebatch, B.Sc., M.R.C.V.S., Principal; R. C. Scott, Experimentalist, and E. L. Orchard, Farm Superintendent.]

The year 1923 will go down in history as one of the most remarkable ever experienced by South Australian farmers. Those who were fortunate enough to have rising land in fallow, harvested bumper yields from early sowings. Good crops were also secured from late-sown fields, but except in light-soil districts very poor returns were, as a rule, garnered from crops sown mid-season. On many farms in the northern wheatgrowing areas the season has been responsible for both heavy and light yields, but, generally speaking, the season has not been conducive to heavy average grain returns. Examples of prolificacy are frequent, but, notwithstanding these, it must be admitted that large areas of prepared land were perforce allowed to stand over without being sown, and, further, many acres of sown land were ultimately abandoned as crop, and given over to livestock. These experiences were due to the erratic nature of the weather. At the College we have found it most difficult to adjust operations to suit the vagaries of the climate.

Starting early in the year—April—we made a good beginning, and, despite the heavy rains that fell in May, very good progress was made by utilising our full strength whenever opportunity offered. The monotonous succession of soaking showers that followed in June and July, however, wrought havoc, and prevented the completion of the cropping programme. For the first time since 1904 it was found impossible to seed successfully the permanent experimental plots; similarly the area set aside for barley had finally to be added to the fields listed for fallowing, and in consequence there are no farm barley crops to report on this year.

From the subjoined table the effect of the season on grain and produce yields can be gauged by comparing the annual and mean returns.

TABLE I.—*Showing Crops Returns for* 1923 *Comparatively with Mean Yields.*

Crop.	Mean Yield. Period.	Mean Yield. Bush.	Mean Yield. lbs.	Average Yield, 1923. Bush.	Average Yield, 1923. lbs.
Wheat	1904-1922	17	42	15	44
Barley	1904-1922	28	44	19	37
Oats	1905-1922	23	22	30	22
		T.	C. L.	T.	C. L.
Hay	1904-1922	2	0 96	2	7 108
Ensilage	1905-1922	6	15 12	6	4 105
Berseem	1912-1922	29	16 53	30	8 3

WEATHER CONDITIONS.

The table shown below is included to indicate the total amount of rainfall for the past season in comparison with that of the five wettest years previously recorded here since 1883.

TABLE II.—*Showing Total and Monthly Rainfall Registered in the Six Wettest Years at Roseworthy College since* 1883.

	1916.	1910.	1909.	1889.	1890.	1923.	Mean, 1883-1922.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
January	1.15	1.72	0.75	2.24	3.17	0.47	0.80
February	0.16	—	0.28	0.07	3.10	—	0.60
March	0.62	4.43	1.17	0.62	1.10	0.02	0.84
April	1.36	0.23	1.91	7.19	0.88	0.10	1.52
May	0.88	3.20	2.89	1.78	1.62	6.01	1.87
June	5.18	2.81	1.84	3.39	4.18	5.03	2.56
July	2.75	2.86	3.80	0.95	4.21	4.48	1.85
August	3.00	1.32	4.56	3.03	3.04	2.42	2.06
September	1.82	2.64	1.52	2.21	1.41	4.73	1.81
October	1.65	2.55	2.55	2.73	2.69	2.17	1.64
November	3.61	1.18	2.08	1.39	1.95	0.36	1.07
December	1.05	0.93	0.70	0.14	0.23	1.67	0.88
Totals	23.23	23.87	24.05	25.74	27.58	27.46	17.51

It will be seen that the past season ranks second to the year 1890 in point of total rainfall, but the difference is only 12 points, and, strangely enough, 27 points were registered before the new year was two days old. The outstanding feature of 1923, however, is the enormous amount recorded in the three seeding months—May, June, and July. No less than 15½in. fell during this period, whereas the highest corresponding figure in the above table is 10in., registered in 1890. Consideration of this point brings us to the subject of rainfall distribution, and reference to the particulars given in the appended table will show clearly wherein the past season failed to satisfy the demands of the wheatgrowers in this locality.

TABLE III.—*Showing the Distribution of "Useful Rain" in the Years* 1917-1923, *Inclusive, Together with the Means for the Previous* 40 *Years.*

	Seeding. Rains. April-May. In.	Winter. Rains. June-July. In.	Spring. Rains. Aug.-Oct. In.	Summer. Rains. November. In.	Totals. In.	Percentage of "Useful" to Total Rain. In.
1917 . .	4.66	4.09	7.32	1.18	17.25	78.91
1918 . .	3.38	2.58	4.19	0.38	10.53	87.68
1919 . .	1.73	1.73	4.70	0.05	8.22	66.40
1920 . .	2.16	5.56	7.16	1.88	16.76	86.84
1921 . .	3.14	3.38	4.81	1.65	12.98	75.64
1922 . .	4.49	5.48	4.91	0.02	14.90	74.50
1923 . .	6.11	9.51	9.32	0.36	25.30	92.13
1883-1922	3.39	4.41	5.52	1.07	14.36	82.01

The "total useful" rain registered in 1923 constitutes a new record, the highest previously noted being 22.67in. in 1889. Never before in the history of the College have the useful rains interfered so seriously with cultural operations. In 1889 no less than 7.19in.—almost one-third of the "useful rain" for that season—fell in the month of April, whereas almost the whole of the 1923 "useful rain" came down during the normal growing stages of the crops. The fall in May—6.01in.—was exceeded by 0.53in. in the year 1883, and the June fall was beaten by 0.15in. in 1916. New maxima were established for July and September during last season, and it will be noted that the percentage of "useful" to "total" rainfall is exceptionally high.

TABLE IV.—*Showing Fallow Rains, August 1st of One Year to March 31st of Succeeding Year, Together with the Corresponding Mean for* 39 *Years.* 1883-1922.

Season	In.	Season.	In.
1904/1905	7.18	1914/1915	3.86
1905/1906	7.96	1915/1916	9.08
1906/1907	11.29	1916/1917	14.79
1907/1908	9.13	1917/1918	10.83
1908/1909	9.51	1918/1919	5.45
1909/1910	17.56	1919/1920	7.27
1910/1911	11.41	1920/1921	13.78
1911/1912	5.88	1921/1922	7.51
1912/1913	13.00	1922/1923	9.32
1913/1914	13.07		
Mean		1883/1922	9.66

By comparison with the mean figure shown above, namely, 9.66in., the past season would appear to have been fairly normal in respect of fallow rains, but here again our grievance is against the distribution rather than the total amount of rain. Nearly 4in. were measured in December, and approximately 5in. fell prior to the December downpour. In the early part of 1923, however, less than half an inch

arrived to freshen the fallow fields and pave the way for the cleaning operations. Between January 25th and May 4th only 12 points of rain were gauged, and in consequence the condition and compactness of the fallows left much to be desired.

TABLE V.—*Showing Details of Weather for the Year* 1923.

Month.	Rainfall.	No. of days on which rain fell	Important Rains.		Minimum Temperature.	Mean minimum Temperature.	Frosts.		Maximum Temperature.	Mean maximum Temperature.
			Date.	Ins.			Date.	Temp.		
January . . .	0.47	7			46.0	58.20			111.00	83.50
February . . .	0.00	0			47.0	60.20			109.50	93.60
March	0.02	1			45.2	53.30			94.00	82.90
April	0.10	2			44.8	54.40			92.00	82.11
May	6.01	21	8	0.90	49.0	53.85			84.00	67.77
			20	0.75						
			21	0.65						
			27	0.65						
			29	0.78						
June	5.03	25	5	0.43	40.0	46.83	26	31.2	72.00	59.52
			10	0.55			28	31.5		
			12	0.48						
			16	0.70						
			24	0.81						
July	4.48	22	6	0.64	37.5	44.63	7	30.5	67.00	57.69
			19	1.09			26	31.0		
			23	0.48						
			30	0.63						
August	2.42	18	1	0.61	36.00	44.13	5	29.0	72.00	59.45
			2	0.22			7	29.0		
			29	0.21			17	29.0		
			30	0.41			19	31.0		
							20	29.5		
September . .	4.73	18	16	0.45	39.00	44.67	1	39.5	80.00	63.94
			20	1.23			4	31.0		
			21	0.60			6	32.0		
			22	0.44			8.	28.0		
			24	0.45						
			28	0.47						
October . . .	2.17	15	11	0.50	39.8	49.13			93.00	68.51
			17	0.24						
			25	0.22						
			30	0.25						
November . .	0.36	7	17	0.21	37.5	48.50			100.00	76.37
December . .	1.67	11	5	0.27	44.5	57.90			106.00	82.95
			14	0.64						
			18	0.31						
		147								

Amongst other facts of interest that may be gleaned from the foregoing summary may be mentioned the number of days on which rain fell—147 in all—and the absence of severe or prolonged frosts to harden the crops and check proud growth.

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1922	68,985	"	23,015	"

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BERSEEM CLOVER.

Slightly more than 3½ acres were devoted to Berseem clover last year, but one plot was so damaged by floodwaters that it had to be abandoned as far as records are concerned. Portions of one other plot which is given over to trials with varying amounts of seed are also excluded from the mean figures, but particulars covering the yields obtained from them are given in a separate table. This crop is grown under irrigation, and in wet years it usually makes growth quite as rapidly as in dry seasons, when the rainmakers are in regular use. A season like 1923, however, affects even irrigated crops to a certain extent. Incessant showers cause the crop to go down, and when the strengthening influence of the sun is denied for days and weeks together the stems soften and rot off at the bend, and both yield and quality of forage are reduced. It is probable that in seasons of phenomenally heavy rainfall the feeding value of this clover is lowered in proportion as the water content is raised, and from this point of view more satisfactory results are obtained when artificial irrigation is needed to supplement the natural rainfall; but from the economic standpoint the nearer the natural fall to the demands of the crop for moisture, the better, provided it is distributed in a manner that permits of strong healthy growth. In 1923 the only irrigations given were the preparatory watering during and after seeding, and the application due two to three weeks later. The yield obtained over the total area of approximately 2 acres was 59 tons 17cwts. 91lbs. Full particulars are set out below:—

TABLE VI.—*Showing Yields of Berseem Clover (Trifolium Alexandrinum) at Roseworthy College, 1923.*

	Total Yield.			Acre Yield.		
	T.	C.	L.	T.	C.	L.
Plot H (1.02 acres)—						
May 28-June 24	9	11	31	9	7	59
July 25-August 29	10	9	88	10	5	75
September 24-October 16	7	5	16	7	2	33
November 9-17	4	2	9	4	0	53
	31	8	32	30	15	108
Plot A (0.75 acres)—						
July 7-August 16	8	16	56	11	15	37
October 10-25	9	1	17	12	1	60
November 17-25	4	11	38	6	1	88
	22	8	111	29	18	73
Plot N (0.20 acres)—						
June 7-July 6	2	11	100	12	19	52
August 17-September 8	2	16	20	14	0	100
October 8-November 16	0	12	52	3	2	86
	6	0	60	30	2	76
Totals, 1.97 acres	59	17	91	30	8	3

TABLE VII.—*Summarising Returns from Irrigated Berseem at Roseworthy College*, 1912-1923.

Year.	"Useful" Rain.	Area.	Total Yield.			Acre Yield.		
	Inches.	Acres.	T.	C.	L.	T.	C.	L.
1912	13.05	1.190	38	12	56	32	9	18
1913	10.82	3.201	108	19	97	34	0	111
1914	6.12	2.294	46	16	94	20	8	43
1915	18.35	3.411	98	16	66	28	19	53
1916	20.25	4.643	165	1	48	35	11	6
1917	17.25	4.003	115	16	55	28	18	12
1918	10.53	3.693	107	18	93	29	4	64
1919	8.22	3.384	96	1	108	28	7	107
1920	16.76	1.368	39	7	21	28	15	48
1921	12.98	1.580	48	0	108	30	19	57
1922	14.90	3.963	120	3	103	30	6	66
1923	25.30	1.970	59	17	91	30	8	3
Means or 12 years						29	17	49

Further tests were made with a view to ascertaining the optimum amount of seed to sow to the acre. Experiments to this end were started in 1921, the quantities of seed used being 15lb.,, 20lb., 25lb., and 30lbs. Similar trials were conducted in 1922, but last year the 15lbs. plot was omitted, and one in which 35lbs. per acre were sown was substituted for it. In every instance, so far, the yields have improved with the addition of more seed, but the increase obtained from the 35lbs. plot last year was less than 2¼cwts. Allowing 2s. per lb. for the seed, this small quantity of green fodder would require an outlay of 10s. an acre, which is more than it is worth. We must refrain, however, from the temptation to base deductions on a single test. The scheme will be carried out again next year, and if better conditions prevail it will be interesting to compare the harvest results with those now under review.

TABLE VIII.—*Showing Yields of Berseem Clover obtained from Light and Heavy Seedings.*

Number of Cut.	Yield per Acre. 1921.			1922.			1923.			Average Yield per Acre. 1921-1923.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
20lbs. of seed per acre—												
First cut	7	17	23	13	3	107	12	0	50	11	6	97
Second cut	9	15	17	13	8	47	13	4	62	12	2	79
Third cut	2	17	45	6	6	13	2	1	108	3	15	18
	20	9	85	32	18	54	27	6	108	27	4	82
25lbs. of seed per acre—												
First cut	8	6	51	14	10	33	12	15	100	11	17	61
Second cut	12	5	60	14	10	20	13	19	12	13	11	68
Third cut	2	9	48	5	17	84	3	1	98	3	16	39
	23	1	47	34	18	36	29	16	98	29	5	56
30 lbs. of seed per acre—												
First cut	8	0	9	16	6	51	12	19	52	12	8	75
Second cut	12	12	26	17	11	63	14	0	100	14	14	100
Third cut	2	12	69	6	7	14	3	2	36	4	0	77
	23	4	104	40	5	15	30	2	76	31	4	28

TABLE VIII.—*Showing Yields of Berseem Clover obtained from Light and Heavy Seedings*—continued.

	1923.			
35lbs. of seed per acre—	T.	C.	L.	
First cut	13	2	6	—
Second cut	14	2	46	—
Third cut	3	0	50	—
	30	4	102	—

ENSILAGE.

For over 30 years it has been the practice at the College to conserve in underground pits upwards of 100 tons of silage. In 1923 we ensiled 272 tons in the new overhead silos, which have a capacity of 300 tons. They are in the form of reinforced concrete circular buildings, and are located immediately outside the door of the cow byres. The diameter is 18ft., and they stand 35ft. above ground level. Shoots have been placed over the port holes for convenient handling, and a powerful silage cutter and blower have been added to the equipment. Owing to the inclement nature of the weather the erection of these structures was not completed as early as expected, and consequently silage making, which usually takes place about the end of August or early September, was prolonged into November. Ordinarily it would have been difficult to find a crop at the right stage for ensiling at this time of the year, but the lateness of the season enabled us to take advantage of the available space, and accordingly we succeeded in storing ample supplies for the ensuing summer and autumn. The quality of the silage, however, is not quite up to our usual standard, as some of the cereals used were admittedly lacking in succulence. This also accounts for the fact that the actual tonnage blown into the silos was a little below their calculated capacity.

With the addition of the Lincoln Red Shorthorn cattle to our dairy herd the annual consumption of silage will range from 150 tons to 200 tons according to the season. We are therefore now in the fortunate position of being able to save enough silage in one year to permit of a surplus of 100 tons to 150 tons being carried over. It is very desirable that this should be so, for where silage is relied upon regularly for succulent fodder between spring and winter it is just as important to hold a reserve supply to tide over periods of drought as it is to retain a surplus of hay.

With regard to this season's silage crops, chief interest centres round Field No. 1, in which were sown plots of the different cereals on the lines of the experiment started in 1922. This field was under pease the year before, and the stubble was disc-ploughed, cultivated,

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and sown during the second week of May. Wheat (Sultan), oats (Lachlan), barley (Roseworthy Oregon), and rye (Black Winter) were drilled in with 2cwts. of 36/38 grade superphosphate; a plot of wheat and oats in combination (Felix wheat, Sunrise oats) was also included. Unfortunately the postponement of silage making forced us to omit the barley plot from the test. The crop was a good one, but had begun to ripen off several weeks before we were ready to commence cutting. The other plots, however, made exceptionally good growth and yield, much above the general average return obtained here during the previous 18 years. The highest tonnage was gained from the wheat plot, and both wheat and oats separately returned more than a similar area sown with mixed seed. In the subjoined table are shown the results obtained from these test plots in the years 1922 and 1923.

TABLE IX.—*Showing Yields of Silage obtained from Plots of Cereals, 1922 and 1923.*

Crop.	1922 Acre Yield.			1923 Acre Yield.			Means.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.
Wheat	8	4	41	10	3	15	9	3	84
Barley	7	0	43	—			—		
Oats	6	17	53	9	14	45	8	5	105
Rye	7	8	98	8	11	29	8	0	8
Wheat and oats	8	13	82	9	2	32	8	18	1

TABLE X.—*Showing Yields of Ensilage, 1905-1923.*

Year.	Rainfall. "Useful."	Rainfall. Total.	Area. Acres.	Total Yield. T.	Total Yield. C.	Total Yield. L.	Yield per Acre. T.	Yield per Acre. C.	Yield per Acre. L.
1905	14.23	16.71	—		—		8	10	0
1906	16.31	19.73	9.50	113	1	0	11	18	0
1907	13.96	15.13	17.15	92	2	75	5	7	34
1908	15.52	17.75	17.00	129	10	76	7	12	44
1909	21.15	24.05	16.962	169	18	90	10	0	3
1910	16.79	23.87	15.490	134	1	43	8	15	32
1911	9.45	13.68	30.740	152	16	28	4	19	47
1912	13.05	14.97	40.700	141	4	73	3	9	45
1913	10.82	15.66	61.511	115	14	24	1	17	70
1914	6.12	9.36	—		—			—	
1915	18.33	19.76	27.384	153	14	107	5	12	33
1916	20.25	23.23	12.443	103	11	28	8	6	51
1917	17.25	21.86	9.176	77	18	84	8	9	98
1918	10.53	12.01	19.284	91	15	75	4	15	21
1919	8.22	12.38	59.436	116	12	101	1	19	28
1920	16.76	19.30	18.464	140	6	8	7	11	109
1921	12.98	17.16	19.607	141	19	47	7	4	91
1922	14.90	20.00	18.52	155	2	76	8	7	59
1923	25.30	27.46	43.559	272	1	108	6	4	105
Mean for 18 years							6	14	61

HAY HARVEST.

The 1923 hay crops were above normal, the average return over a total area of 196.48 acres, being 2 tons 7cwts. 108lbs., as against a mean yield for the preceding 19 years of 2 tons 96lbs. In all 471 tons of

wheaten and oaten hay were saved, and it is of importance to state that the last load was safely in the stack before the December rains fell. There is a tendency in a climate such as ours, in which dry conditions usually prevail, to overlook the importance of securing the hay crop against the injurious effects of summer showers. Rain has a very injurious influence on the quality and feeding value of exposed cereal hay, and if this commodity were sold on a standard of quality serious losses through dockage would be occasioned by delay in storing the stooked sheaves. Everyone will admit freely that in a season such as we have just experienced a proportion of "smoky" hay is unavoidable, but there seems good reason for the conviction that if farmers realised the extent of the damage wrought by the solvent action of rain on hay left lying in the field, and the effect of feeding this relatively unnutritious type of fodder to working horses, more expedition would be shown in the clearing of the hay fields, and more concern evinced when circumstances hinder the completion of the work.

For the sake of comparison the average hay yields obtained at Roseworthy College in each year since 1904, together with the rainfall records, are set out in the following table.

TABLE XI.—*Showing Average Hay Yields on the College Farm, 1904-1922.*

Year.	Rainfall. "Useful" Inches.	Rainfall. Total Inches	Area Acres.	Total Yield. T.	Total Yield. C.	Total Yield. L.	Average Yield. T.	Average Yield. C.	Average Yield. L.
1904	11.60	14.70	93.000	238	0	0	2	11	22
1905	14.23	16.71	67.000	198	8	22	3	2	71
1906	16.31	19.73	93.000	241	0	0	2	11	96
1907	13.96	15.13	51.000	91	14	20	1	15	108
1908	15.52	17.75	112.800	293	6	23	2	7	5
1909	21.15	24.05	145.397	404	4	54	2	15	68
1910	16.79	23.87	94.900	224	7	6	2	7	31
1911	9.45	13.68	200.100	290	12	94	1	8	6
1912	13.05	14.97	248.450	432	7	49	1	14	90
1913	10.82	15.66	258.200	207	7	111	0	16	7
1914	6.12	9.36	247.647	181	13	107	0	14	75
1915	18.33	19.76	341.649	806	7	36	2	7	23
1916	20.25	23.23	121.727	374	17	8	3	1	66
1917	17.25	21.86	74.580	153	2	81	2	1	6
1918	10.53	12.01	82.144	126	19	47	1	10	102
1919	8.22	12.38	298.760	280	16	48	0	18	90
1920	16.76	19.30	283.064	710	18	4	2	10	26
1921	12.98	17.16	254.835	423	7	76	1	13	25
1922	14.90	20.00	269.184	647	2	81	2	8	9
1923	25.30	27.46	196.481	471	4	3	2	7	108
Mean for 20 years							2	1	23

For the last two seasons we have conducted hay tests with wheat and oats sown separately and in mixture, and in both instances the yield from the mixed crop has been in advance of that obtained from either cereal sown alone. There would not appear to be much difference in this respect between wheat and oats taken separately. In 1922

they were practically on a level, and last year the balance was in favor of the oat crop to the extent of about 9cwt. It is not anticipated, however, that this position will be maintained by oats when dry seasons supervene. In all probability the early wheats will then reverse the order, so that over a long period of years it seems likely that the results will reveal very little advantage in favor of either. Granted, however, that the tonnage obtained is approximately equal, the superior feeding value of oaten hay will always stand to its credit, and so important a point should not be overlooked.

TABLE XII.—*Summary of 1923 Hay Returns.*

Field. Crop.	Area. Acres.	Total Yield. T.	C.	L.	Acre Yield. T.	C.	L.
No. 3—Wheat	25.993	57	11	18	2	4	32
Daly's B—Wheat	25.163	68	13	24	2	14	64
No. 5B—Wheat	33.589	64	10	70	1	18	47
	84.745	190	15	0	2	5	2
No. 5B—Oats	37.947	102	19	2	2	14	29
No. 5B—Wheat and oats	5.029	16	15	100	3	6	89
No. 7B—Wheat and oats	17.196	48	8	74	2	16	37
	22.225	65	4	62	2	18	78
Headlands—Various	51.564	112	5	80	2	3	62
Totals	196.481	471	4	32	2	7	108

TABLE XIII.—*Hay Returns from Wheat and Oats Sown Separately and as Mixed Crops, Seasons 1922 and 1923.*

	1922. T.	C.	L.	1923. T.	C.	L.	Means. T.	C.	L.
Wheat	2	11	77	2	5	2	2	8	40
Oats	2	10	103	2	14	29	2	12	66
Wheat and oats	2	18	86	2	18	78	2	18	82

TABLE XIV.—*Showing Hay Returns from Different Wheats.*

1920-1923

Variety.	1920. T.	C.	L.	1921. T.	C.	L.	1922. T.	C.	L.	1923. T.	C.	L.	Means. T.	C.	L.
Rajah	—			2	0	65	3	1	80	2	2	9	2	8	14
Maharajah	—			2	4	43	2	16	13	2	2	46	2	7	71
Sultan	2	16	75	1	18	107	2	11	24	2	0	22	2	6	85
King's Red	2	2	106	2	9	71	2	8	45	2	4	92	2	6	51
King's White	2	5	23	2	4	22	2	9	2	2	5	66	2	6	0
Felix	2	8	33	2	2	49	2	10	13	2	1	108	2	5	79
Early Crossbred 53	3	4	71	2	0	57	2	4	88	1	10	83	2	5	19
President	2	3	19	1	19	89	2	16	4	1	11	96	2	2	80
Caliph	—			2	1	93	2	10	96	1	14	14	2	2	30
Greeley	—			—			—			1	17	88	—		
Emperor	—			—			—			1	15	84	—		
Leak's Rust Proof	—			—			—			1	15	50	—		

It remains to consider the relative merits of the different varieties of wheats and oats brought under trial as hay producers. Twelve wheats were subjected to test last year, and amongst them were a

number that have been under observation since 1920. The heaviest yielders this harvest proved to be King's White and King's Red, but when we give consideration to the average returns over three to four seasons we find the first three places held by Rajah, Maharajah, and Sultan respectively. These wheats belong to a series raised at the College by the Experimentalist (Mr. R. C. Scott) from some unfixed crosses made by his predecessor. The credit for the production of these popular varieties belongs properly to Messrs. Scott and Adams, who undertook the task of selecting from a heterogenous mass of material the desirable types as indicated by comparison with a standard fixed as the result of weeks of patient investigation. They are responsible for the success attained by the production of these wheats, and are deserving of the credit attaching thereto. The varieties in question are derived from King's Early by crossing with beardless varieties in an effort to secure types similar in general character to King's Early but without awns. Felix is another of the same group, which includes also President and Emperor. Further particulars can be obtained by reference to the following table.

The Early Burt oat again heads the list as a hay yielder. The returns given by this variety during the past three seasons were remarkably high and singularly uniform. In 1921, 3 tons 3cwts. 76lbs.; in 1922, 3 tons 2cwts. 36lbs.; and in 1923, 3 tons 34lbs., with a mean yield of 3 tons 2cwts. 11lbs. per acre. Many of the other oats recently introduced by the College have also given excellent yields, notably Mulga, Yarran, Quandong, and Bathurst Early. Referring to the mean figures, which are, after all, the most important, it will be seen that Sunrise ranks next to Early Burt, and Yarran is only a few pounds below it. Kherson, which is worthy of a higher position in the table, did not appreciate the wet conditions, and germinated poorly. Nevertheless, it yields very fine quality hay, and is one of the best storm resisters we have gown.

TABLE XV.—*Showing Hay Returns from Different Varieties of Oats, 1921-1923.*

Variety.	1921.			1922.			1923.			Means.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
Early Burt	3	3	76	3	2	36	3	0	34	3	2	11
Sunrise	3	0	30	2	8	67	2	19	5	2	15	109
Yarran		—		2	10	97	2	19	30	2	15	8
Guyra		—		2	17	66	2	12	28	2	14	103
Scotch Grey	2	18	8	2	7	42	2	13	66	2	13	2
Bathurst Early	1	14	71	3	2	91	2	17	52	2	11	71
Kherson	3	0	19	2	16	44	1	17	84	2	11	49
Lachlan	2	9	12	2	10	58	2	13	93	2	11	17
Algerian		—		2	6	0	2	5	3	2	5	58
Mulga		—			—		3	0	2		—	
Quandong		—			—		2	18	34		—	

(To be continued.)

THE MEDITERRANEAN FRUIT FLY.

(*Ceratitis Capitata,* Wied.)

[By Geo. Quinn, Horticultural Instructor.]

The recent outbreaks of this pest in the orchards on the Mildura and Curlwaa Irrigation Areas in Victoria and New South Wales respectively, together with the press agitation thereon and the somewhat heroic steps taken to extirpate the insect in the former district, have revived the publicity given to this particular fruit fly about 17 years ago, when it appeared almost simultaneously in orchards situated in many parts of Victoria.

The reappearance of this fruit fly so close to our eastern borders should bring vividly before our fruitgrowers the fact that it stands as a menace on both sides of our State. In the past our immunity has doubtless been largely attributable to our occupying a geographical position whereby a wide expanse of arid, or at least non-fruitgrowing, country stretched between ourselves and our neighbors on both our eastern and western borders, and that their coastal fruit fly infested country was located still further away. These rolling distances certainly formed an effective barrier to natural spread by flight. Again, we are not importers of large volumes of fruit from the fruit fly inhabited areas. These natural and economic factors, combined with a somewhat rigid system of inspection of all fruits and plants at places of entry, have undoubtedly contributed to the immunity our orchards have thus far enjoyed from this much dreaded pest. Writing in the *Journal of Agriculture* for June, 1907, on the subject of the world-wide distribution of this insect, the writer expressed the opinion that "it is only a question of time when this pest must find its way into our midst." This belief, though luckily not yet verified, is still held by me, and the possibilities of its realisation have been vastly increased during the last decade owing to the widespread use of rapid means of transport by motor vehicle opening up almost numberless places of entry along our borders for the bringing in by travellers and excursionists of non-commercial parcels of fruit from east and west.

The two or three days which the overland journey from the Eastern coastal country now occupies rather invites the carrying of fresh fruits for consumption *en route,* and there is nothing more natural than the jettisoning by the wayside of any specimens showing decay or insect attacks.

With a view to preventing the transmission of this pest in a living stage from one country or State to another in commercial consignments of fruit many investigations have been made in most parts of the world where it is established.

Being safely buried in the pulp of the fruit by the ovipositor of the parent fly, the eggs and the maggots arising therefrom are immune from the effects of ordinary gases such as are used with safety and success in destroying surface feeding insects.

Mediterranean Fruit-fly.

(*Ceratitis Capitata*, Wiedmann).

After Mally, in *Agricultural Journal* of Cape Colony.



1. Maggot. 2. Puparum. 3. Male F 4. Female Fly. 5. Wing. 6. Ovipositor extended. The small figures are life-size.

In consequence of most chemical reagents being inimical to the retention of the flavor or keeping qualities of the fruit, cold storage has been resorted to with very encouraging results. This method has thus far presented to fruit traders the most hopeful way out of the fruit fly difficulty. On this matter Fuller (Natal Entomologist) reported in 1906 that larvae tunnelling in peaches survived confinement in a temperature of 40 deg. Fahr. for 124 days. In 1907 Lounsbury (Cape Town) recorded that all maggots in fruit kept for three weeks in a temperature of 38 deg. to 40 deg. Fahr. perished. In 1907 (Hooper, of Western Australia) reported larvae and eggs as all perishing when kept in 33 deg. to 35 deg. for 15 days. In 1908 Lounsbury again reported the death of all larvae in fruit confined from 21 days to 27 days at 38 deg. to 40 deg. In 1913-14 Back and Pemberton (Hawaii) made extensive tests on larvae and eggs in apples and peaches kept at 32 deg. Fahr. Of 6,747 eggs tested for nine days all perished, and only two out of 2,327 hatched after seven days. After being subjected to this temperature for from 10 days to 15 days and then removed to a warmer position not one egg hatched out of a batch of 2,221. A further trial showed a complete sterilisation of the eggs held for 21 days to 25 days at 40 deg. to 45 deg. Fahr. Of larvae tested none survived eight days at 32 deg. Fahr., and of 2,558 removed from the cold store after from nine days to 14 days' confinement none survived. From 454 only 11 survived the seventh day of confinement. Tests made at 33 deg. Fahr. had the same effect. These investigators affirm that the younger larvae resist death for a lesser period than the more fully developed specimens, whilst the eggs appear to lose their fertility in a shorter time still. In the *Journal* of the Department of Agriculture of the South African Union for October, 1923, the Chief Entomologist (Mr. Lounsbury) throws out a somewhat disquieting note relative to the absolute effectiveness of cold storage at temperatures used in transporting fruit overseas. He quotes instances of the flies being raised from larvae which had survived the journey to London in a temperature which ranged from 37 deg. Fahr. upwards. Other instances of tests made by Senior Entomologist Mally, who, by the way, is recognised as a world-wide authority on this fruit fly, indicate that larvae survived in paper-wrapped Salwey peaches heavily embedded in wood wool and held in cold storage at Cape Town for six weeks at a temperature varying from 25 deg. to 39 deg. Fahr., but averaging 33.972 deg. Mally says, "The total number of larvae taken from the fruits that had been refrigerated four weeks or longer was 82. From them were reared 28 males and 29 female flies. Only one fly was reared from the 14 puparia found in the fifth and sixth weeks." The temperature records of the chamber for the entire six weeks were studied by Mally, who reported "readings being noted every two hours with apparently inconsequential exceptions, the range being from 25 deg. to 44 deg. The mean of the readings is 33.972 deg. Over half of the readings are 33 deg., and on only three days is 33 deg. not recorded. On those three days the range is 34 deg. to 39 deg."

It would thus appear that Mally has demonstrated that the larvae of this fruit fly may survive in cold storage at about 34 deg. Fahr.

for considerably longer than the three weeks claimed as fatal by Back and Pemberton.

Mally considers that the larvae found dead in cold stored fruit have been killed by the sudden chilling caused by the transition from a high to a low temperature; also that the apparently uniform successes of earlier years could possibly be attributable to the tests being made with non-wrapped fruits packed in single layers in boxes and with very little wood wool, whilst these latter trials were with fruits wrapped individually and securely embedded in a bulky packing of wood wool as is used in exporting soft fruits.

Mr. Lounsbury concludes this report with the remark—"It follows there is still hope that refrigeration may be made thoroughly effective, and also that it is ordinarily effective."

During the past year, when the importation of apples from Western Australia was undertaken by merchants, this Department insisted on the fruit bringing an official certificate to the effect that it had already been in cold storage for not less than two months. Failing this it was bonded in a cold store for that period.

Any fruitgrower, desirous of studying the habits of this pest and methods of prevention found most useful in infested countries, may secure a bulletin from this office dealing with these matters in detail.

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KYBYBOLITE EXPERIMENTAL FARM.

HARVEST REPORT, 1923-24.

[By L. J. Cook, Manager.]

This farm is situated in the hundred of Binnum, in the south-east of the State, and contains about 1,000 acres of land, immediately surrounding the old Kybybolite sheep station. The land is slightly undulating, and varies considerably in texture, color, and composition. The great bulk of the soils consists of comparatively heavy and cementy loams, containing a large proportion of ironstone rubble, over stiff clays of varying depths, and much lacking in the element lime, whilst there is a fair amount of heavy working "crabhole" land.

The Season, 1923.

The season has been a very poor one, especially for autumn and winter sown cereals; conditions were more suitable for spring and summer crops, and these generally have yielded above the average. A perusal of the rainfall table shows that January, February, March, and April constituted the driest period on record at the farm, and during that period no land could be prepared for seeding. The dry period broke early in May, and then rain fell almost continuously throughout the winter, so that during the months of May, June, and July the rainfall was considerably above the average for these months. During August average conditions prevailed, but during September heavy rains fell, and these further hindered the growth of the winter cereals, which had somewhat recovered from the effects of winter saturations. Good average conditions prevailed during the last three months, and summer crops benefited. A very fair growth of natural feed was maintained throughout the year on the pastures, of which a larger area was available on account of such small areas being under crop. Sufficient feed was available in the fields, and very little hand-feeding of stock was necessary. Clovers germinated particularly well on the pastures, and maintained really good growth on those fields that have now received a comparatively large number of dressings of phosphatic fertiliser.

The following table sets out in detail the rainfall at the farm since 1906:—

Rainfall Distribution at Kybybolite, 1906-1923.

	Means, 1906-1915.	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	Means, 1906-1923.
January . .	0.37	1.29	0.45	0.29	0.16	0.08	1.07	0.40	0.39	0.44
February	0.93	0.28	2.81	0.23	2.35	0.07	0.88	0.17	0.31	0.91
March. . .	1.53	0.03	1.17	0.27	0.84	0.98	0.63	0.20	0.01	1.08
April . . .	1.50	2.07	0.74	1.38	0.06	0.38	0.62	1.30	0.00	1.20
May	2.52	0.69	4.72	2.48	2.09	2.85	1.72	2.18	4.66	2.59
June .	3.14	3.56	1.33	3.52	1.53	4.31	2.16	2.68	5.03	3.08
July. . . .	3.13	2.68	4.47	2.42	2.21	3.04	3.03	2.50	3.78	3.08
August. . .	2.67	2.94	2.69	2.76	1.08	4.29	3.55	2.83	2.51	2.74
September .	2.96	2.77	2.96	0.53	2.53	2.44	2.97	2.58	4.07	2.80
October . .	1.80	2.20	2.78	2.70	1.64	0.98	1.24	2.72	2.09	1.91
November .	1.55	3.28	2.21	0.65	0.29	0.91	3.24	0.32	1.08	1.53
December .	1.21	1.74	0.36	1.09	0.82	0.54	1.38	2.81	1.74	1.25
Total rainfall .	23.31	23.53	26.69	18.32	15.60	20.87	22.49	20.69	25.67	22.61
Total "Useful" rain Apr.-Nov. .	19.27	20.19	21.90	16.44	11.43	19.20	18.53	17.11	23.22	18.93

In what we know as our "cereal" districts the yield of cereal crops can usually be estimated fairly reliably on the amount of rain which falls between April and November. Even in such districts the yield is to a large extent dependent on the distribution of that rainfall over the period; but in the peculiar soil conditions of this farm, where the average annual rainfall is comparatively good, the success of these crops depends almost wholly on the distribution of this "useful" rain. In the next table the distribution of the April to November rainfall is set out. It shows excessive seeding, winter, and spring rains, whilst the early summer rain was a little below average. The total of 23.22in. of "useful" rain out of a total fall of 25.67in. for the year is the highest amount recorded at the farm since 1909—1¼in. more than 1917, the next highest records of "useful" rain. Years of heavy rainfall between April and November have invariably been poor years for cereal crops.

Distribution of "Useful" Rain, Kybybolite, 1923.

	1923. In.	Means, 1906-1923. In.
Seeding rains (April to May)	4.66	3.79
Winter rains (June-July)	8.81	6.16
Spring rains (August-October)	8.67	7.45
Early summer rains (November)	1.08	1.53
Total "useful" rain	23.22	18.93

Crops.

Our practice of late has been to grow cereals for forage, hay, and grain to be fed mainly to stock on the farm, together with other crops (principally leguminous and cruciferous) in rotation tests with cereals.

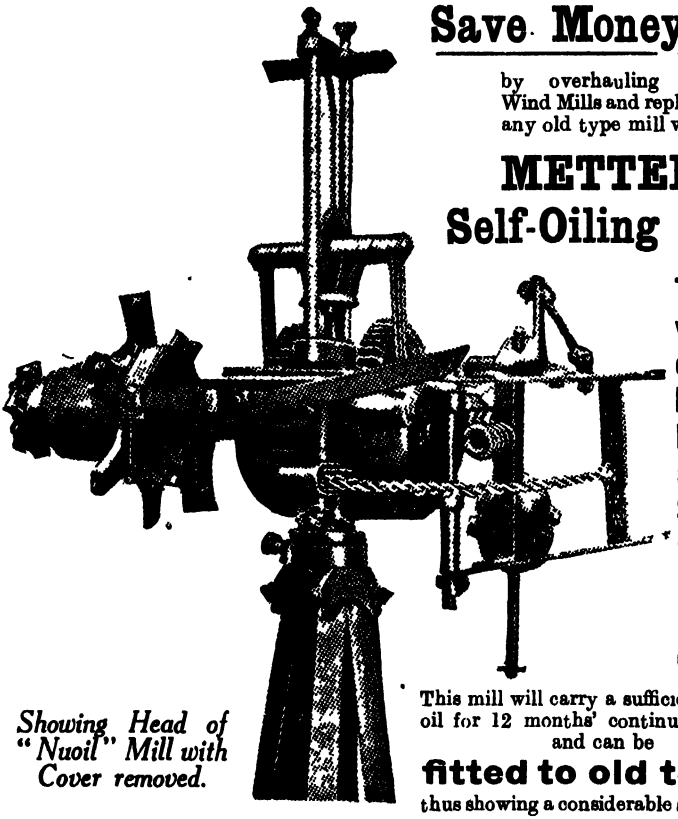
On account of the late opening of the season, the area under crops was greatly curtailed, but every effort was made to get as much sown as possible, and we were able to sow all crops, with only one exception, in the permanent rotation tests.

Green Forage Crops.—It has been usual of late years to sow fair areas of stubble land early in the season with a mixture of cereals, to provide stock feed during the winter months, at which time natural pastures are usually very poor. This year this class of cropping naturally had to be abandoned. However, Field No. 14 was sown as a hay crop, but in the spring the weeds and clovers had overrun the cereals, and the crop was then treated as a forage crop, and fed off by the milking herd. The field was fallowed early in October, 1922, was cultivated in November, February, and again in March. It was sown dry late in April with 60lbs. Queen Fan wheat, and 40lbs. Algerian oats per acre, with 1cwt. super. The crop gave good feed throughout October, November, and part of December, carrying the equivalent of 1.35 sheep per acre per year.

Crimson Clover.—Field No. 6A, in a six-course rotation, came in for a grazing crop, and crimson clover was again utilised, sown on oaten hay stubble. The field was skim-ploughed on May 9th and 10th, immediately after the first rains, and 10lbs. clover seed per acre was at once broadcasted over the field. Good rains following firmed the seed in the soil, and a good germination resulted. The field produced good spring feed, and was used by the dairy herd during October, November, and December. It carried the equivalent of 4.04 sheep per acre for the three months.

Lucerne.—The field of this crop, No. 10, which was sown in 1918, and has never been irrigated, again made very useful growth during the late spring and summer months. On account of the late rains and cold spring weather, the first cut was late and rather weedy. During the middle of November 8 tons 15cwts. were cut from the area of 2.96 acres, equalling 2 tons 19cwts. and 14lbs. per acre. This was put into the silo. The field was then dressed with 1cwt. super per acre, and a second cut of 30cwts. was secured on December 17th-22nd, and fed to the dairy herd. The field was grazed at odd times during the year by the dairy herd, and carried the equivalent of 1.39 sheep per acre, in addition to the two cuts that were carted off the land.

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Paspalum.—The plants of this grass in Field No. 9 have continued to make fair growth during the summer months. The field has carried the equivalent of 1.26 sheep per acre for the year. The average carrying capacity of the field for the past three seasons has been 1.30 sheep per acre.

Wimmera Rye Grass.—On account of the short seeding period we were unable to sow a field of this grass. However it germinated well from self-sown in various fields, and is spreading over the farm.

Subterranean Clover.—An area of 30 acres of this clover was established during the year in fields Nos. 20c and 11A. Early in the year it was decided to change the rotation of fields Nos. 20A to 20E from peas, wheat, kale, kale, and oats, to wheat, oats, and three years subterranean clover. Consequently Field No. 20c, which carried a wheat crop in 1922, was sown to oats immediately after the break-up of the weather in May, with a dressing of 2cwts. 36 per cent. super per acre, and 4lbs. subterranean clover seed per acre was broadcasted behind the drill. Half of the field was harrowed after the seed was broadcasted, and the other half was harrowed before the seed was sown. Rain fell immediately, and a good germination was secured all over the field. The clover grew well, spread in amongst the oat plants, and practically covered all the field, except those parts that were under water for at least two months of the year. The clover seeded well, and it is anticipated that besides giving good stubble feed, there will be ample seed to make a real good stand of pasture during 1924. Field No. 11A (about 1½ acres) was also seeded with 3lbs. clover and with 50lbs. barley. These came away well with self-sown Wimmera rye grass, and the field was used for grazing calves during the spring and summer.

Alsike Clover.—On account of the promising results secured from this clover in small trials, it was this year sown with Italian rye grass in the two-year grazing plot, Field No. 9F in a six-course rotation. The field was ploughed shallow on May 18th, and immediately harrowed down. Ten pounds Italian rye grass and 2lbs. Alsike clover were broadcasted per acre, and rolled in. A really good germination of both plants resulted. They grew well amongst the self-sown barley in the field. The clover made quite a good stand, and continued growing well into January. The plot was grazed by milk cows, and later by sheep, and carried for the year the equivalent of 2.14 sheep per acre.

Bokhara or Sweet Clover.—This clover was tried, spring sown, in No. 8B. The field was ploughed to a depth of 6in. early in September, and harrowed, cultivated and rolled to a suitable tilth during the following six weeks. On October 31st one acre of the field was

sown with the clover in rows 28in. apart, 5lbs. seed, and 50lbs. super being used. A very fair germination resulted, and as soon as the rows were sufficiently visible the cultivator was put between them. However, a thick growth of summer weeds, such as fat hen, nightshade, and wireweed came away in the rows of clover, and the latter made only a fair showing against the weeds.

Annual Summer Fodders (without irrigation).—On account of the poor prospects of the ordinary autumn-sown cereals producing sufficient ensilage and hay for the use of the farm, comparatively large areas were prepared and sown to summer crops. Field No. 16 was ploughed 4in. deep early in September, immediately harrowed and cultivated, and on September 11th was drilled with the following crops in rows 28in. apart, and all with 50lbs. super per acre:—4 acres maize (Silvermine variety) at the rate of 30lbs. seed per acre; 3 acres Black Amber Sorgo at the rate of 10lbs. seed per acre; 4 acres sunflowers at the rate of 6lbs. seed per acre.

The field was harrowed after it was drilled. The germination, except in the case of a few sunflowers, was a failure owing to the heavy cold rains which fell immediately after seeding. The field was cultivated on October 19th, and the three plots resown on October 23rd, as before, excepting for the maize variety, Improved Yellow Dent being sown this time. A good germination of maize and sunflowers followed the second sowing; the sorghum germinated slowly and irregularly.

A portion of Field No. 15 that had been ploughed for oats early in June, but which we were unable to drill, was again ploughed early in September, and immediately cultivated and harrowed down. It was again cultivated in October, and on the 24th of that month drilled with the following crops in rows 28in. apart, and all with 50lbs. super per acre:—7 acres sunflowers, at the rate of 6lbs. seed per acre; 1 acre Sudan grass, at the rate of 8lbs. seed per acre; 7 acres maize (Early Leaming), at the rate of 30lbs. seed per acre.

The field was harrowed after it was sown. A good germination resulted, and immediately the rows were quite visible both fields were cultivated between the rows; and they were cultivated periodically throughout the summer months to check weed growth and prevent undue loss by evaporation. The crops made good growth, especially the sunflowers, which were not affected by the changeable weather conditions as much as others. The crops produced green feed for the dairy herd during January and February, and the bulk of them were chaffed into the silo during the latter month. The sunflowers

yielded 3 tons 7cwts. 72lbs. green feed per acre, the maize 1 ton 10cwts. 109lbs., and Sudan grass (first cut) 7cwts. 5lbs. The sorghum was grazed in the field.

The following table shows the yields of these crops during the last two seasons:—

Yields of Summer Crops, Kybybolite, 1922 and 1923 (without irrigation).

Year.	Winter rains (Apr.-Sep).	Late spring & summer rains (Oct-Jan.).	Sunflowers.	Maize.	Sudan grass.	Means.
	Ins.	Ins.	T. C. L.	T. C. L.	C. L.	T. C. L.
1922 .	14.07	6.24	1 17 0	2 11 0	12 0	1 13 37
1923 .	20,05	5.83	3 7 72	1 10 109	7 5	1 15 25
Average	17.06	6.03	2 12 36	2 0 110	9 58	1 14 31

Turnips.—Fields Nos. 9E (2 acres), 4C (4 acres), and 6F (10 acres) were sown to turnips during 1922. A fair growth resulted. Field 4C, on account of weed growth, was fed to lambs in the autumn of 1923, whilst the other two fields were reserved, and fed to sheep during the winter. They gave splendid feed for the ewes during June and July, when natural feed was scarce. The actual carrying capacity of the crops was not as high as was the case during the previous year, but that was due mainly to the long dry spell of the late summer and autumn. The crops actually carried in Field No. 9E the equivalent of 3.20 sheep. Field 4C 2.63, and Field 6F 1.58 sheep per acre per year.

Turnips were again sown in the spring of 1923 in the same three rotation in Fields Nos. 9D, 4B, and 6E. The plots were ploughed deeply in late August and early September, and harrowed and cultivated during the spring, whenever the soil was in suitable condition, to check weed growth. The seed was drilled on a rolled surface from October 31st to November 2nd in rows 28in. apart. The Mammoth variety was used, and 4lbs. per acre was sown in 9D, the other two fields receiving 2lbs. Each plot was dressed with 50lbs. super 36 per cent. per acre. The seed was drilled very shallow, and covered by rolling. A good germination resulted in all fields, and cultivations were given as soon as the rows of plants were visible, and periodically during the summer months. The crops made good quick growth, and the late summer rains should ensure a large number of good sized turnips for next winter's feeding.

Kale.—Sown in Field No. 20B in 1922, failed during the winter. The dry autumn killed out a number of the plants, and the extreme wet following immediately soon destroyed the balance of them. On

account of the difficulty in satisfactorily handling kale in these 30-acre fields, this five-course rotation has now been altered to wheat, oats, and three years subterranean clover. Two acres of kale (Thousand Headed) was sown in Field No. 8B towards the end of October, but a poor germination resulted, and grubs thinned out the young plants early in their growth.

Silver Beet.—Field No. 10A was ploughed deeply during early September, and cultivated, harrowed, and rolled to a suitable tilth during October. On November 2nd, half-an-acre was sown with silver beet in rows 28in. apart, 4lbs. soaked seed and 50lbs. super per acre being used. Seed was drilled shallow, and covered by rolling. A good germination was secured, and cultivations were given during the summer. Some very useful green feed has been available during January and February.

Chou Moellier.—An area of 1½ acres of this crop was grown in Field 10A, the land being prepared as described for silver beet—2lbs. seed and 50 lbs. super were given per acre. The crop is being grazed, and so far has given quite a considerable amount of feed during the summer.

ENSILAGE CROPS.

Field No. 3A, during 1922, carried a green feed crop of barley, which was grazed during the winter and spring. The field was ploughed on May 15th, and immediately sown with a mixture of 60lbs. White Essex wheat, and 40lbs. Algerian oats, and 1cwt. super per acre. This field contains a fair amount of organic matter, and the crop withstood the wet well. During September and October, 48cwts. of green feed were cut and fed from the field—the balance of the crop was used for ensilage making.

Field No. 3B carried a green feed crop of oats during 1922, was ploughed on May 14th this year, and immediately sown similarly to Field 3A. The crop made good growth in patches.

Field No. 9C produced 21 bushels of wheat per acre during 1922. The stubble was burnt in March, and the field skim-ploughed on May 15th. On May 17th it was sown with 60lbs. Algerian oats and 20lbs. Black Vetches per acre, with 1cwt. super. The crop germinated well, and made very fair growth; the vetches made a better growth in comparison than the oats.

Portion of Field 9B was sown in error to oats and vetches, and this was also cut and made into ensilage.

As mentioned under "Lucerne," Field No. 10 was mowed of its first growth of lucerne and grass, and put into the silo.

Also maize and sunflowers from Fields Nos. 15 and 16 were cut and chaffed into the silo during February. Particulars of these crops have been given under the heading of "Annual Summer Crops."

The following table shows the returns of ensilage secured from the various fields:—

Ensilage Yields, Kybybolite, 1923.

Field.	Area. Acres.	Variety of Crop.	Total Yield. T.	C.	L.	Yield per Acre. T.	C.	L.
No. 3A	2.39	Wheat and oats mixed	12	2	56	5	1	52
No. 3B	5.80	Wheat and oats mixed	21	15	28	3	15	5
No. 15	5.23	Sunflowers	17	13	84	3	7	72
No. 9C	1.94	Oats and vetches	5	16	0	2	19	89
No. 10 .. .	2.96	Lucerne	8	15	0	2	19	14
No. 9B	1.00	Oats and vetches	2	13	14	2	13	14
No. 15	4.77	Maize	7	7	84	1	10	109
No. 16 . .	6.47	Maize and sunflowers	7	17	84	1	4	43
No. 15	1.10	Sudan Grass	0	7	84	0	7	5
Average ..	31.66		84	8	98	2	13	39

The average return of less than 3 tons per acre is poor, and the following table shows it in comparison with the previous three years, during which the silo has been in use:—

Ensilage Returns, Kybybolite, 1920-23.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. T.	C.	L.	Yield per Acre. T.	C.	L.
1920	20.87	19.20	25.27	44	10	84	1	15	28
1921	22.49	18.53	19.01	85	8	70	4	9	99
1922	20.69	17.11	11.95	61	8	101	5	2	94
1923	25.67	23.22	31.66	84	8	98	2	13	39
Average .	22.43	19.51	——	——			3	10	37

Hay Crops.

Hay growing is important on a livestock farm such as this, and every endeavor was put forward to produce sufficient hay for our own requirements. We were able to carry over about 40 tons from our previous harvest, and therefore needed to cut at least 80 tons this season. To do this we had to cut a number of crops that were really sown for grain production.

As usual, three types were grown, namely, wheat and oats separately, and mixed together.

Mixed Hay.—Field 16A was fallowed late in October, 1922, cultivated in February, and again in March. During April a dressing of 1 ton agricultural lime per acre was applied. On May 15th the field was skim-ploughed, and sown with 60lbs. White Essex wheat and 40lbs. Algerian oats, and 1cwt. super per acre. This field has very

poor under-drainage, and consequently the soil was practically saturated for several months of the winter. The crop recovered a little in the spring, and we secured 11cwts. 45lbs. hay per acre.

Field No. 14 was also sown with mixture for hay, but as the crop was doing very poorly, it was grazed in the spring. Particulars have been given under the heading "Green Forage Crops."

Oaten Hay.—Only one field, No. 6B, was sown exclusively for oaten hay, but Field 4B and portion of 15 necessarily had to be cut to secure sufficient hay.

Field 4C, in 1922, carried a turnip crop, which was grazed during February of 1923. On May 9th the field was skim-ploughed, and sown with 60lbs. Algerian oats and 1cwt super per acre. This field easily produced the most and best growth of cereal on the farm for the season.

Field No. 6B carried a grazing crop of crimson clover during 1922. It was ploughed on May 11th and 12th, and sown with 60lbs. Algerian oats and 1cwt. super per acre. This field has poor under-drainage, and the crop did poorly all the season.

Field No. 15 was grazed during 1922, was ploughed during the latter end of May, and drilled as weather would permit during June. As portions of the field possess fair under-drainage, some growth of hay was received.

The following table shows the yields of oaten hay for the season:—

Oaten Hay Yields, Kybybolite, 1923.

Crop.	Field Grown.	Area Acres.	Total Yield. T.	C.	L.	Yield per Acre. T.	C.	L.
Algerian	No. 4C	4.05	9	15	56	2	8	30
Mixed varieties ..	No. 15	11.05	7	9	56	0	13	59
Algerian	No. 6B	9.57	5	1	28	0	10	65
Average		24.67	22	6	28	0	18	10

Wheaten Hay.—Field No. 6D carried a pea crop yielding 19½ bushels per acre in 1922. It was ploughed on May 16th and 17th, and sown immediately with 60lbs. White Essex wheat, and 1cwt. super per acre. This germinated well, and considering the season, the crop made very nice growth, and yielded very well.

Field No. 4A also carried peas in 1922, but these were grazed. The field was ploughed on May 15th and 16th, and immediately drilled with 60lbs. Leak's Rust-Proof wheat, and 1cwt. super per acre. Portion of this field became waterlogged, but the balance carried a very heavy crop.

Field No. 20D was fallowed in September, 1922, limed with 1 ton agricultural lime per acre, and cultivated twice during summer and

autumn. It was skim-ploughed towards the end of May, and sown under rather wet conditions with three varieties of wheat—White Essex, Leak's Rust-Proof, and Queen Fan—at the rate of 70lbs. seed and 1cwt. super per acre. The field suffered very much from the wet, but on the ridges, and better drained portions, the crop made quite nice growth.

The phosphate rock tests with wheaten hay were this year in Field No. 16B. They were sown in real good conditions of soil in the middle of May, at the rate of 80lbs. White Essex seed per acre. This field consists of very poor soil, and was waterlogged for several months; much of the wheat made little or no recovery in the spring.

Some wheat plots were also cut from No. 15 to help secure the hay quota. The following table shows the wheaten hay yields for the season:—

Wheaten Hay Yields, Kybybolite, 1923.

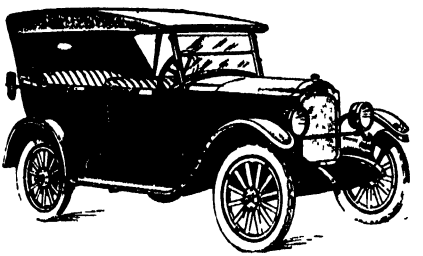
Crop.	Field Grown.	Area Acres.	Total Yield. T.	C.	L.	Yield per Acre. T.	C.	L.
White Essex	No. 6D	9.14	14	5	0	1	11	20
Leak's Rust Proof .	No. 4A	5.28	6	16	56	1	5	95
Mixed Varieties ..	No. 20D	29.50	23	18	0	0	16	23
Mixed Varieties ..	No. 15	17.66	8	13	0	0	9	89
White Essex	No. 16B	10.00	3	10	84	0	7	8
Average		71.58	57	3	28	0	15	109

The next two tables set out the total hay cut, and the yield per acre in the one case, and in the other the averages secured for the different types, for the period 1918-1923:—

Hay Yields, Kybybolite, 1923.

Kind.	Area. Acres.	Total Yield. T.	C.	L.	Yield per Acre. T.	C.	L.
Oaten	24.67	22	6	28	0	18	10
Wheaten	71.58	57	3	28	0	15	109
Mixed	6.15	3	10	14	0	11	45
Farm average	102.40	82	19	70	0	16	23

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Cereal Hay Crops, Kybybolite, 1918-1923.

	Yield per Acre.											
	Oaten.			Mixed.			Wheaten.			Farm Average.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
1918	1	4	97	0	16	106	1	5	30	1	2	58
1919	1	11	26	1	14	52	1	1	89	1	8	45
1920	0	17	92	0	17	4*	0	12	70	0	17	4
1921	1	6	0	1	17	25	1	5	67	1	12	43
1922	1	10	102	1	12	45	1	17	31	1	13	51
1923	0	18	10	0	11	45	0	15	109	0	16	23
Means	1	4	92	1	4	102	1	3	10	1	5	0

* As no mixture of hay was grown during 1920, the average hay yield for the season has been allowed for that year.

The following table shows the returns of hay for the farm since 1910:—

Hay Returns, Kybybolite, 1910-1923.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield.			Yield per Acre.		
				T.	C.	L.	T.	C.	L.
1910	28.35	21.08	106.13	88	19	28	0	16	85
1911	22.23	14.72	94.04	136	6	110	1	9	28
1912	20.83	18.23	26.29	67	7	70	2	10	76
1913	18.44	13.93	108.55	166	11	0	1	10	77
1914	11.94	8.43	109.00	90	1	0	0	16	59
1915	23.30	21.18	108.66	111	14	56	1	0	65
1916	23.53	20.19	77.35	135	1	0	1	14	102
1917	26.69	21.90	96.77	49	9	0	0	10	25
1918	18.32	16.44	152.85	172	1	70	1	2	58
1919	15.60	11.43	148.81	211	7	14	1	8	45
1920	20.87	19.20	66.05	56	5	28	0	17	4
1921	22.49	18.53	118.57	192	0	14	1	12	43
1922	20.69	17.11	85.88	143	13	14	1	13	51
1923	25.67	23.22	102.40	82	19	70	0	16	23
Means	21.35	17.54	—	—			1	5	77

Oat Crops.

Field No. 15, as previously stated, was ploughed late in May, and between May 31st and June 2nd a collection of oat varieties was sown under good soil conditions in the north-west corner of the field, at the rate of 60lbs. seed and 1cwt. super per acre. These were left and harvested for grain. A few other varieties were grown on other portions of the field, but as they did not receive such suitable seeding conditions, they were cut out for hay.

Field No. 20c carried a 21-bushel wheat crop in 1922. The stubble was burnt in March, and the field skimmed over immediately after the rains in May. On May 9th to 11th it was sown with 60lbs. Algerian oats and 2cwts. super per acre, and 4lbs. Subterranean Clover seed was broadcasted behind the drill. The crop started really well, but as the field is one of the wettest on the farm, the oats suffered very much by the long continued rains, and the subsequent yield was very disappointing.

The following table includes a list of varieties harvested, and their yields:—

Oat Variety Yields, Kybybolite, 1923.

Variety.	Field Grown.	Area. Acres.	Total Yield. B.	L.	Yield per Acre. B.	L.
Algerian	No. 15	2.15	36	21	16	39
Newmarket White	No. 15	0.085	1	17	16	31
Ruakura	No. 15	0.63	10	18	16	23
Yarran	No. 15	0.38	5	31	15	8
Scottish Chieftain	No. 15	0.064	0	38	14	34
Guyra	No. 15	0.38	5	16	14	8
Mulga	No. 15	0.38	5	10	13	33
White Horse	No. 15	0.064	0	34	13	11
Quandong	No. 15	0.38	4	34	12	31
Bathurst Early	No. 15	0.38	4	22	11	39
Clydesdale	No. 15	0.38	4	20	11	34
Glen Innes No. 1	No. 15	0.053	0	24	11	13
Algerian Tartar	No. 15	0.38	4	6	10	37
Stable King	No. 15	0.053	0	23	10	34
Ascot White	No. 15	0.053	0	21	9	36
Sunrise	No. 15	0.19	1	35	9	35
Lachlan	No. 15	0.128	1	8	9	15
Very Early Black Hybrid	No. 15	0.096	0	34	8	34
Fulghum	No. 15	0.064	0	19	7	17
Goldfinder	No. 15	0.61	4	19	7	13
Wilga	No. 15	0.064	0	22	8	24
Algerian	No. 20c	28.34	132	26	4	27
Champion Black Tartarian	No. 15	0.032	0	4	3	5
Total		35.34	228	22	—	
Farm average		—	—		6	19

The following table sets out the returns received from oats since 1910:—

Oat Returns, Kybybolite, 1910-1923.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. B.	L.	Yield per Acre. B.	L.
1910	28.35	21.08	77.00	1,001	0	13	0
1911	22.23	14.72	60.91	828	13	13	24
1912	20.83	18.23	103.00	3,450	36	33	20
1913	18.44	13.93	94.55	1,460	10	15	18
1914	11.94	8.43	6.00	61	3	10	7
1915	23.30	21.18	79.74	1,251	25	15	28
1916	23.53	20.19	61.94	1,388	39	22	17
1917	26.69	21.90	20.66	154	13	7	19
1918	18.32	16.44	36.93	554	25	15	1
1919	15.60	11.43	50.77	1,144	34	22	22
1920	20.87	19.20	36.29	613	1	16	36
1921	22.49	18.53	52.82	708	39	13	17
1922	20.69	17.11	86.40	1,611	31	18	26
1923	25.67	23.22	35.34	228	22	6	19

Barley Crops.

Only two fields were sown to barley, and both of these to the one variety—Shorthead. Field No. 9E carried a turnip crop in 1922. This was grazed by sheep during May and June, 1923, and pigs cleared up the last of the turnip roots during July, when they rooted the whole of the soil over very well. On August 27th the field was cultivated, and immediately drilled with 60lbs. seed and 1cwt. super per acre, and harrowed. The crop germinated well, grew to quite a nice height, and headed very well.

Field No. 6E also carried a turnip crop, which was grazed by sheep during July, 1923. From August 27th to 29th the field was ploughed, harrowed, and sown with 70lbs. barley and 1cwt. super per acre, and harrowed. This crop germinated well, but made comparatively short growth, and had a number of very poor patches in it.

The following table shows the yields received from the two fields:—

Barley Yields, Kybybolite, 1923.

Variety.	Field Grown.	Area. Acres.	Total Yield. B. L.	Yield per acre. B. L.
Shorthead	No. 9E	1.94	47 15	24 19
Shorthead	No. 6F	10.81	126 7	11 33
Total		12.75	173 22	—
Farm average		—	—	13 30

The average yield of nearly 14 bushels per acre is satisfactory considering the poor weather conditions of the season.

The following table shows the barley returns received since 1910:—

Barley Returns, Kybybolite, 1910-1923.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. B. L.	Yield per Acre. B. L.
1910	28.35	21.08	45.39	299 29	6 30
1911	22.23	14.72	58.76	552 16	9 20
1912	20.83	18.23	50.00	1,500 0	30 0
1913	18.44	13.93	35.00	527 0	15 3
1914	11.94	8.43	3.02	37 48	12 29
1915	23.30	21.18	50.28	789 39	15 35
1916	23.53	20.19	43.24	273 37	6 17
1917	26.69	21.90	66.31	304 41	4 30
1918	18.32	16.44	35.08	266 48	7 31
1919	15.60	11.43	39.71	655 1	16 25
1920	20.87	19.20	55.77	474 7	8 25
1921	22.49	18.53	54.56	339 22	6 11
1922	20.69	17.11	10.78	196 42	18 13
1923	25.67	23.22	12.75	173 22	13 30
Means . . .	21.35	17.54	—	—	12 11

Rye Crop.

A few acres of rye were sown in Field No. 15 during July, but germination was poor, and only a few odd patches were worth harvesting. From 2.90 acres 3 bushels 9lbs. seed were gathered.

The following table shows all yields of rye grown at this farm since 1914. In compiling these figures, rye has been taken as weighing 60lbs. per bushel:—

Rye Returns, Kybybolite, 1914-1923.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. B.	L.	Yield per Acre. B.	L.
1914	11.94	8.43	6.00	90	16	15	3
1915	23.20	21.18	7.27	48	14	6	38
1916	23.53	20.19	8.20	35	3	4	16
1917	26.69	21.90	—	Failure.			
1918	18.32	16.44	4.62	52	0	11	15
1919	15.60	11.43	7.23	37	7	5	8
1920	20.87	19.20	14.71	47	48	3	15
1921	22.49	18.53	10.44	74	44	7	9
1922	20.69	17.11	4.09	24	50	6	4
1923	25.67	23.22	2.90	3	9	1	5
Means	20.90	17.76	—	—		5	59

Wheat Crops.

Field No. 9B, in a six-course rotation, had been grazed for two years, was fallowed on October 2nd, 1922, cultivated, and limed with 1 ton per acre in the spring, and harrowed and cultivated twice during the summer and autumn. It was skim-ploughed on May 15th, and drilled with 65lbs. Federation wheat and 1cwt. super per acre. The crop made only fair growth. Also two plots of wheat sown on May 26th in Field No. 15 were left and harvested for grain for seed for the next season.

The following table shows the wheat yields received:—

Wheat Yields, Kybybolite, 1923.

Variety.	Field Grown.	Area. Acres.	Total Yield. B.	L.	Yield per acre. B.	L.
Federation	No. 9B	0.94	8	47	9	21
Crossbred 53 Early	No. 15	2.96	11	5	3	45
White Tuscan	No. 15	3.82	12	51	3	22
Total		7.72	32	43	—	
Farm average		—	—		4	14

The following table shows the wheat returns since 1910:—

Wheat Returns, Kybybolite, 1910-1923.

Year.	Total Rainfall.	"Useful" Rainfall.	Area.	Total Yield.		Yield per Acre	
	In.	In.	Acres.	B.	L.	B.	L.
1910	28.35	21.08	15.00	79	43	5	19
1911	22.23	14.72	17.15	232	45	13	34
1912	20.83	18.23	81.91	1,876	35	22	54
1913	18.44	13.93	48.20	1,288	56	26	44
1914	11.94	8.43	22.17	238	32	10	46
1915	23.30	21.18	79.64	882	31	11	5
1916	23.53	20.19	98.75	1,875	19	18	59
1917	26.69	21.90	70.46	231	29	3	17
1918	18.32	16.44	58.52	1,027	40	17	34
1919	15.60	11.43	78.26	1,190	50	15	13
1920	20.87	19.20	73.37	812	8	11	4
1921	22.49	18.53	125.24	1,548	54	12	22
1922	20.69	17.11	61.73	872	38	14	8
1923	25.67	23.22	7.72	32	43	4	14
Means . . .	21.35	17.54	—	—		13	22

PEA CROPS.

Peas were grown in two fields in various rotations. Field No. 4D carried a 30-bushel oat crop in 1922, was ploughed on August 1st, and immediately limed with 1 ton agricultural lime per acre. On August 7th it was harrowed, and sown with 120lbs. Early Dun peas and 1cwt. super per acre, and harrowed again. The peas germinated well, and made good quick growth, returning the satisfactory yield of 22bush. per acre.

Field No. 6C carried an 18bush. barley crop in 1922, was ploughed in June, and limed during July with 30cwts. agricultural lime per acre. The field was cultivated on August 28th, and drilled with 120lbs. Early Dun peas and 1cwt. super per acre, and harrowed. This crop germinated well, but had made only a little growth when the heavy rains of September fell. These checked the peas, and they did not recover well. The bulk of the field has poor underdrainage.

Field No. 16C should also have been sown to peas, according to rotation, but on account of wet condition of the field it was impossible to work teams on the land until late in September, and it was then decidedly too late to sow peas, and the field was treated as bare fallow instead.

The following table shows the yields of peas received:—

Pea Yields, Kybybolite, 1923.

Variety.	Field Grown.	Area. Acres.	Total Yield. B.	Total Yield. L.	Yield per Acre. B.	Yield per Acre. L.
Early Dun	No. 4D	4.11	90	11	21	57
Early Dun	No. 6C	8.84	54	34	6	10
Total		12.95	144	45	—	
Farm average		—	—		11	11

The general returns of peas for the season are fairly satisfactory.

They have a decidedly good effect on the cereal crop following them, and as a crop are worth further perseverance in the district:—

Field Pea Returns, Kybybolite, 1916-1923.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. B.	Total Yield. L.	Yield per Acre. B.	Yield per Acre. L.
1916	23.53	20.19	32.64	498	34	14	49
1917	26.69	21.90	Failure.	Failure.		Failure.	
1918	18.32	16.44	27.54	21	20	0	46
1919	15.60	11.43	42.68	80	41	1	53
1920	20.87	19.20	4.05	6	11	1	32
1921	22.49	18.53	24.22	189	55	7	50
1922	20.69	17.11	18.77	261	57	13	57
1923	25.67	23.22	12.95	144	45	11	11
Means	21.73	18.50	—	—		6	30

The following table summarises generally the returns of the chief crops harvested for 1923, showing the average yield per acre, their values at current rates, and also as stock food, compared with hay at £3 per ton, based on tables prepared by the Director of Agriculture (Professor Arthur J. Perkins):—

Value of Crops Harvested, Kybybolite, 1923.

Type of Crop.	Yield per Acre. T.	C.	L.	Current Market Prices per ton. s.	d.	Value at Current Market Rates. £	s.	d.	Value as Stock Food per ton. s.	d.	Value as Stock Food per Acre. £	s.	d.
Ensilage	2	13	39	20	0	2	13	4	19	5	2	11	9
Hay	0	16	23	80	0	3	4	10	60	0	2	8	7
	B.		L.	per bush.					per bush.				
Peas (grain)		11	11	7	0	3	18	3	3	7	2	0	1
Barley		13	30	3	0	2	0	10	2	7	1	15	2
Oats		6	19	3	0	0	19	5	2	1	0	13	6
Wheat		4	14	4	0	0	16	11	3	10	0	16	3
Rye		1	5	4	0	0	4	4	3	9	0	4	1

The following table shows the average annual value per acre of crops harvested at the farm during the last three seasons:—

Value of Crops Harvested, Kybybolite, 1921-1923.

Year.	Ensilage.	Hay.	Wheat.	Peas.	Oats.	Barley.	Rye.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
At current rates—							
1921 . .	3 7 5	4 17 2	3 1 10	2 18 9	1 13 7	0 18 8	1 3 0
1922 . .	3 17 2	5 0 4	3 10 8	5 4 7	2 6 8	2 14 9	0 19 5
1923 . .	2 13 4	3 4 10	0 16 11	3 18 3	0 19 5	2 0 10	0 4 4
Means	3 6 0	4 7 5	2 9 10	4 0 6	1 13 3	1 18 1	0 15 7
As stock food—							
1921 . .	4 7 3	4 17 2	2 7 5	1 8 1	1 8 0	0 16 1	1 8 7
1922 . .	4 19 10	5 0 4	2 14 2	2 10 0	1 18 10	2 7 2	1 4 4
1923 . .	2 11 9	2 8 7	0 16 3	2 0 1	0 13 6	1 15 2	0 4 1
Means	3 19 7	4 2 0	1 19 3	1 19 5	1 6 9	1 12 10	0 19 0

Experiments with Raw Rock Phosphates.

Experiments to test the agricultural value of raw rock phosphates were commenced at Kybybolite in 1919, the rocks being low grade, and containing respectively (*a*) calcium phosphate, and (*b*) aluminium phosphate equivalent to about 18 per cent. of phosphoric acid.

Raw Rock Phosphates on Crops to be Harvested.—To test the rock phosphates on crops to be harvested, a rotation consisting of wheat (for hay)-peas, in which both the wheat and pea crops are dressed with the same fertilisers was laid down on some of the poorest land on the farm. The results secured from these plots during the past five seasons are shown in the following tables. It is noticeable that Plot 2, which is treated with lime and superphosphate, is continuing to increase its advantage over the others in producing wheaten hay, and has, this year, produced more hay than all the other four plots added together. On account of the extreme wet conditions, teams could not be got on to the land sufficiently early to warrant the sowing of peas in this field, and consequently the five plots were ploughed up in the spring, and treated as bare fallow.

Raw Rock Phosphates Tests on Wheaten Hay—Peas Rotation.

Wheaten Hay Yields, 1919-1923.

Manuring per Acre. Plot.	1919.	1920.	1921.	1922.	1923.	Means 1919-23
	T. C. L.	T. C. L.	T. C. L.	T. C. L.	T. C. L.	T. C. L.
1. No manure	0 10 84	0 9 0	0 18 84	0 7 21	0 8 14	0 10 85
2. 5cwts. lime and 1cwt. super	1 6 105	0 17 35	0 18 28	2 4 0	0 18 42	1 4 109
3. 1cwt. super.	1 7 28	0 13 0	0 17 84	1 12 70	0 4 84	0 19 8
4. 1cwt. aluminium rock phosphate	1 6 91	0 12 91	0 14 91	1 6 80	0 1 98	0 16 68
5. 1cwt. calcium rock phosphate	1 3 7	0 11 0	0 12 21	1 1 60	0 2 28	0 14 1

Pea Yields, 1919-1923.

Plot. Manuring per Acre.	1919.	1920.	1921.	1922.	1923.	Means, 1919-23.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
1. No manure	0 30	failure	2 54	5 54	not sown	2 19
2. 5cwts. lime and 1cwt. super	1 17	failure	5 26	15 29	not sown	5 33
3. 1cwt. super	1 4	failure	7 4	10 45	not sown	4 43
4. 1cwt. aluminium rock phosphate	1 30	failure	7 10	7 51	not sown	4 8
5. 1cwt. calcium rock phosphate	0 39	failure	5 15	5 45	not sown	3 2

In the above hay plots, White Essex wheat at the rate of 80lbs. per acre was sown on May 14th to 15th.

Raw Rock Phosphates on Natural Pasture.—The same two rock phosphates are being tested on natural pasture, on plots 3½ acres in area, and the following table shows the manure applied, the year in which each plot was top dressed, together with the feeding produced, estimated in terms of sheep per acre per annum, for the years 1921 to 1923.

Returns of Natural Grazing Test, Kybybolite, 1921-1923.

Plot.	Manure applied per acre. 1919.	1920.	1921.	1922.	1923.
1.	1 ton alum. phos.	nil	nil	nil	nil
2.	11cwts. al. phos.	1cwt. al. ph.	1cwt. al. phos.	1cwt. al. phos.	1cwt. al. phos.
3.	1 ton lime and 1cwt. super	1cwt. super	1cwt. super	1cwt. super	1cwt. super
4.	11cwts. cal. phos.	1cwt. cal. phos.	1cwt. cal. phos.	1cwt. cal. phos.	1cwt. cal. phos.
5.	1 ton cal. phos.	nil	nil	nil	nil
6.	No manure	nil	nil	nil	nil

RETURNS OF NATURAL GRAZING TEST, KYBYBOLITE, 1921-1923.—*Continued.*

Plot.	Grazing. Sheep per acre. 1921.	1922.	1923.	Means, 1921-23.
1	1.52	1.47	1.91	1.63
2	1.64	1.41	1.31	1.45
3	1.84	2.06	2.50	2.13
4	1.48	1.20	1.33	1.34
5	1.33	1.27	1.53	1.38
6	1.11	0.83	0.80	0.91

This year the plots were grazed simultaneously with comparatively small flocks of sheep during July, August, October, November, December, and January. Plot 3 stood out in contrast to the others during the whole season, producing earlier and thicker growth. Naturalised clovers are becoming plentiful on all the manured plots. Small blocks of each plot were hurdled off from the sheep during the whole year, and a botanical analysis is being made by Mr. E. W. Pritchard, Botanical Assistant of the Horticultural Branch, of all growths appearing on the different plots.

Improvement of Pastures.

Another set of pasture plots has been set out during the year in Field No 13, in which it is purposed to test an imported phosphate called "Tetraphosphate" against ordinary superphosphate and lime. The plots are set out for a five-year test, with dressings as follows:

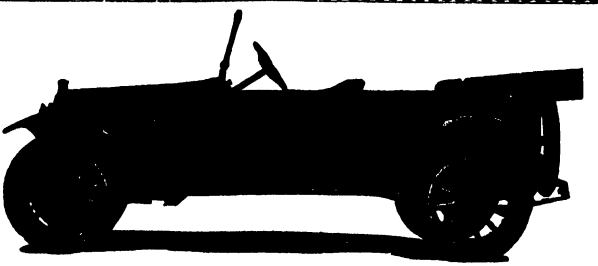
Plot 1.—1cwt. tetraphosphate annually.
Plot 2.—5cwts. tetraphosphate, one application.
Plot 3.—10cwts. lime, one application, and 1cwt. tetraphosphate annually.
Plot 4.—1cwt. superphosphate annually.
Plot 5.—5cwts. superphosphate, one application.
Plot 6.—No manure.

The plots were top-dressed early in July, and some very marked results were quickly noticeable, Plots 4 and 5 standing out prominently, especially with improved clover growth. Plot 5 produced much more feed than Plot 4, but as weather conditions prevented the fencing of the plots sufficiently early, all the plots necessarily had to be grazed together, hence feeding results for each plot are not available for this season.

Rotation of Crops Experiments.

Rotation A.—This five-course rotation of 30-acre fields has now been changed to wheat, oats, and three years subterranean clover, and in view of the great promise of this clover, this course should, during the next few years, provide some interesting results.

Rotation B.—A six-course rotation has been carried on in a series of 2-acre fields. The rotation is as follows:—wheat; oats and vetches; turnips, oats, or barley; rye grass and clover; rye grass and clover; and one cycle of crops has now been completed. Details of the



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seeding of these plots have already been given amongst the general crop report. The yields of the grain and hay crops, and the turnips grown in this rotation, are as follows:—

Six-Course Rotation of Crops, Kybybolite, 1918-1923.

Year.	Wheat.		Oats and Vetches.			Turnips.	Oats or Barley.		
	B.	L.	T.	C.	L.	Sheep per Acre.	B.	L.	
1918 .. (9A)	8	11	(92) 0	14	12		(9D) 9	4	(oats)
1919 .. (9F)	11	19	(9A) 0	10	56		(9C) 13	17	(oats)
1920 .. (9E)	15	24	(9F) 1	15	92		(9B) 11	21	(oats)
1921 .. (9D)	12	6	(9E) 1	13	35		(9A) 6	22	(oats)
1922 .. (9C)	20	59	(9D) 1	7	93	(9F) 5.85	(9F) 21	1	(barley)
1923 .. (9B)	9	21	(9C) 0	14	106	(9E) 3.20	(9E) 24	19	(barley)
Means ..	12	53	1	2	84	4.52	10	6	oats, 4 yrs.
							22	35	barley, 2 yrs

Rotation C.—The Norfolk four-course rotation—turnips, oats, peas, and wheat—has been tested in 4-acre fields of crops. The returns of wheat and oats have been very satisfactory to date from this rotation. The following table shows the returns received for the past five seasons:—

Four-Course Rotation of Crops, Kybybolite, 1919-1923.

Year.	Peas			Wheat. Grain.		Wheat. Hay.		
	B.	L.		B.	L.	T.	C.	L.
1919 (4D)	2	31	(4A)	29	26			
1920 (4C)	1	32	(4D)	29	50			
1921 (4B)	3	14	(4C)	8	40	1	13	92
1922 (4A)	fed off		(4B)			1	17	10
1923 (4D)	21	57	(4A)			1	5	95
Means ..	7	18		22	39	1	12	28

Year.	Turnips. Sheep per Acre.		Oats. Grain.			Oats. Hay.		
				B.	L.	T.	C.	L.
1919			(4C)	17	4			
1920			(4B)	32	27			
1921	(4D)	1.74	(4A)	destroyed				
1922	(4C)	2.63	(4D)	30	0			
1923	(4B)		(4C)			2	8	30
Means		2.18		19	38	2	8	30

Rotation D.—A six-course rotation—peas; wheat; turnips; oats, or barley; clover; barley, or oats—has been under test in 9-acre fields. This series was commenced in 1920, and returns to date are as follows:—

Six-Course Rotation of Crops, Kybybolite, 1920-1923.

Year.	Peas.	Wheat.	Turnips. Sheep per Acre.
	B. L.	B. L.	
1920	(6F) Failure	(6A) 17 59	
1921 . ..	(6E) 13 5	(6F) 18 44	(6A) 1.75
		T. C. L.	
1922	(6D) 19 26	(6E) 2 11 49	(6F) 1.58
1923 .. .	(6C) 6 10	(6D) 1 11 20	
Means ..	9 10	18bush. 21lbs. 2 ton 1cwt. 34lbs.	1.66

	Oaten Hay.	Clover. Sheep per Acre.	Barley.
	T. C. L.		B. L.
1920 . ..	(6C) 1 5 5		(6E) 6 18
1921 . ..	(6B) 1 2 32	(6C) 1.98	(6D) 5 7
1922 . ..	(6A) 1 18 39	(6B) 1.39	(6C) 17 22
1923 . ..	(6B) 0 10 65	(6A) 1.01	(6F) 11 33
Means .	1 4 7	1.46	10 7

Results of Liming at Kybybolite, 1919-1923.

The following table shows the average returns for various crops received this season from all fields that have been limed during the last seven years, in comparison with those received from all fields that have never been limed:—

Return from Crops on Limed and Unlimed Areas, Kybybolite, 1923.

Variety of Crop.	Limed. Acres.	Limed. Yield per Acre.	Unlimed. Acres.	Unlimed. Yield per Acre.
		T. C. L.		T. C. L.
Ensilage	5.90	2 18 37	25.76	2 12 23
Hay	56.12	1 1 47	46.28	0 9 100
		B. L.		B. L.
Wheat	0.94	9 21	6.78	3 32
Oats	28.34	4 27	7.00	13 28
Barley	12.75	13 30	—	—
Peas	12.95	11 11	—	—

A PEAR TREE CANKER.

[By Geoffrey Samuel, B.Sc., Lecturer on Plant Pathology, University of Adelaide.]

South Australia is peculiarly free from canker diseases of fruit trees. The very destructive "apple canker" (*Nectria galligena*) of Europe and America is unknown here, as also are the less dangerous, but nevertheless important, black-rot canker, blister canker, bitter-rot canker, apple-blotch canker, superficial bark canker*, and several others.



Fig. 1.—Beurre d'Angleterre pear tree, with upper branches killed back during the winter by *Coniothecium* cankers on the bark.

There is one type of canker which occasionally occurs here, however, both on apples and pears. Hitherto only comparatively isolated specimens of this have been found, but during the winter just past

* *Sphaeropsis malorum, Nummularia discreta, Glomerella rufomaculans, Phyllosticta solitaria, Myxosporium corticolum.*

one of the pear trees at the Government Experimental Orchard at Coromandel Valley became badly affected, and many twigs died back a considerable distance under the attack This disease does not exactly correspond with the description of any other pear-twig disease which can be found in the literature on this subject in Adelaide, so that some account of it as it occurs in South Australia will be given

Symptoms

On examining the Beurre d'Angleterre pear tree which became badly affected at Coromandel Valley (Fig. 1), it was found that the cankers almost invariably commenced at a leaf scar on a twig, or at the junction of a twig and a branch The cankers had a definite raised margin, and gradually increased in size from the leaf scar or twig junction as a centre, eventually girdling the stem, and continuing to extend upwards and downwards (Fig 2) Just beyond the margin



Fig. 2.—Cankers on twigs of the tree shown in Fig. 1, showing peeling off of the skin (epidermis) of the bark, and exposed black layer beneath.

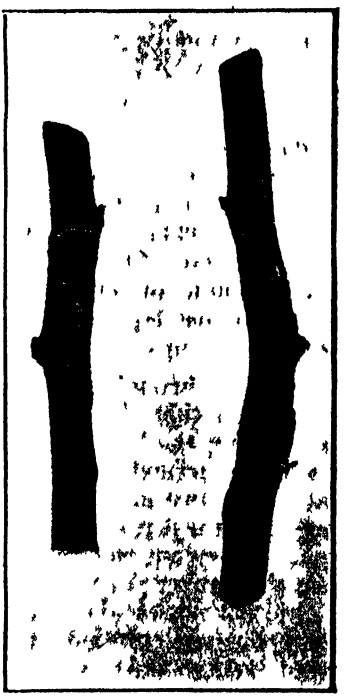


Fig. 3.—Cankers on apple twigs from the River Murray

of the cankers the bark was perfectly sound, but just within the margin the skin (epidermis) of the bark had flaked off, or could easily be pulled off, exposing a dull black area beneath. Towards the top of the affected branches the cankers had completely girdled them.

sometimes for a distance of 6in. or more. Lower down, however, the cankers were only circular or oval patches of various size round the infection centre, as though they had started more recently.

The cankers made fairly rapid headway during the winter, which was exceptionally wet. When spring came practically none of the branches gave shoots above where they had been girdled by the disease; and twigs lower down, springing from smaller cankers also usually failed to shoot (in many cases the canker had run up the side twig, girdling it first). The tree was then heavily pruned, and all the most badly affected wood removed, though it would have been too severe to prune it right down below the smallest cankers. These small cankers left, when examined two months later, did not seem to be making further headway, and will most probably be flaked off in time by the bark.

Similar, but less severe, cankers have been found from time to time on apples and pears from several parts of the State. They usually grow much more slowly, sometimes showing a slight concentric zonation (Fig. 3). They are usually noticed and removed during the annual pruning.

Cause of the Disease.

A small scraping from the blackened area in a canker where the skin has flaked off, when examined under the microscope, shows that the blackening is largely due to the presence of thousands upon thousands of little irregular black packets or aggregations of cells of a fungus (Fig. 4). This simple fungus, consisting only of various-sized packets of dark-colored cells, is a Coniothecium. No other fungus could be found in connection with the cankers, even when they were kept in a moist jar for two months. (No pycnidia or perithecia have ever been found on cankers.)

A section through the edge of a canker is illustrated in Fig. 4. It can be seen that the fungus grows just underneath the skin of the bark, killing the bark cells for some distance below, and causing the skin, or epidermal layer, of the bark to flake off. The section was made about two months after the new spring growth of the trees had started, and it is probable that the layer of cork, *c.c.*, had been recently formed to cut off the injured part of the bark. During the winter, when the cankers increased in size so rapidly, it is probable that the tree did not possess the activity to form such a cork layer to cut off its enemy, but was only able to do so as soon as a little of the warmth of spring came to start growth once again.

There has been a Coniothecium fungus described as causing an apple branch canker and a scabbing and cracking of the fruit, from South Africa, Europe, and New Zealand. This fungus has been named *Coniothecium chomatosporum*, Corda. But the description of its effect on the bark does not correspond exactly with the South Australian cankers. It is described as causing small dark specks, or reddish-brown irregularly raised blisters, which later burst, exposing a black layer beneath. Moreover, in South Australia no attack upon the fruit has yet been observed. Also Massee† has described two other

in the case of the one tree at Coromandel Valley last year, this canker has not done great harm to trees in South Australia. It is probable that the exceptional weather conditions of last winter, combined with a rather greater susceptibility of this variety of pear, explain so sudden and unusual an attack. It is the only tree of this variety grown at the orchard. The cankers also occurred in less severe form on one or two other trees this season.

MOUNT GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1924.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk			Butterfat.		
			Per Herd during February.	Per Cow during February.	Per Cow August to February.	Per Herd during February.	Per Cow during February.	Per Cow August to February.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs
2/A	15	15	6,162·5	410·83	3,745·22	282·67	18·84	147·45
2/B	9	9	4,437	493·00	5,699·83	200·33	22·26	202·38
2/C	16	9·93	2,558·5	159·91	3,412·25	127·11	7·94	130·13
2/E	12	12	6,583	548·58	4,565·42	279·06	23·26	189·61
2/H	24	24	13,246 5	538·62	4,668·16	594·87	24·21	182·21
2/I	14	14	6,873	490·93	4,837·74	293·66	20·98	186·25
2/J	13	13	9,120·5	701·58	6,043·10	370·39	28·49	240·28
2/K	24	21·97	10,121·5	421·73	4,164·03	422·31	17·60	157·39
2/L	24	20·31	11,175·5	465·64	3,049·01	529·10	22·05	133·71
2/O	33·66	20·76	8,997	267·29	3,332·48	369·60	10·98	125·63
2/R	16	16	11,629	726·81	7,086·09	465·76	29·11	279·46
2/S	6	6	4,509·5	751·58	5,697·61	202·05	33·68	254·93
2/T	12	11·41	8,069	672·42	5,475·38	323·20	26·93	203·23
2/U	17	15·69	7,948	467·53	5,577·65	323·56	19·03	216·56
2/V	21	17·97	6,421·5	305·78	3,214·92	274,47	13·07	128·79
2/W	16·52	13·83	5,681·5	343·91	5,903·72	240·69	14·57	213·03
2/X	Withdrawn from Association.							
2/Y	12	11	6,786	565·50	5,402·92	303·09	25·26	214·08
2/Z	12	10·52	4,573	381·08	4,298·01	201·90	16·83	172·02
2/Aa	Withdrawn from Association.							
2/Bb	9	8·31	3,240·5	360·06	3,925·00	135·07	15·01	148·84
2/Cc	13	13	4,683·5	360·27	3,511·32	233·32	17·95	148·85
Means	15·96	14·19	7,140·83	447·45	4,488·30	308·61	19·34	174·12

RIVER MURRAY HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1924.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during January.	Per Cow during January.	Per Cow October to January.	Per Herd during January.	Per Cow during January.	Per Cow October to January.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1/C	31·94	31·48	27,474	860·37	3,362·91	1,064·53	33·33	125·82
1/J	21·32	15·23	9,571	453·50	2,007·75	407·44	19·31	89·39
1/L	19	18·13	11,483·5	603·85	2,754·00	533·05	28·03	118·31
1/M	22	16·81	9,781	444·59	1,604·56	486·41	22·11	81·84
1/R	18	18	9,579	532·17	2,261·62	436·76	24·26	104·61
1/T	15	10·03	8,462·5	564·17	1,953·38	392·56	26·17	98·69
1/W	17	16	8,881·5	522·24	2,163·43	343·06	20·18	83·33
1/Y	18·97	16·16	11,460	604·11	2,509·28	513·19	27·05	115·33
1/Z	20·10	14·74	8,963	445·92	2,176·71	394·66	19·63	99·56
1/CC	23	21·13	11,291·5	490·93	2,123·11	479·11	20·83	90·05
1/DD	25·13	20·13	12,787	508·83	2,453·86	576·92	22·96	107·68
1/EE	11	10	6,138	558·00	2,610·65	291·22	26·47	120·51
1/FF	12	12	8,184	682·00	2,957·96	343·09	28·59	122·02
1/GG	12	12	8,323·5	693·62	2,960·40	366·93	30·58	134·17
1/HH	13	11·58	9,142	703·23	2,923·74	423·06	32·54	125·73
1/II	13	10	6,928·5	532·96	2,532·65	330·38	25·42	108·46
1/JJ	15	11·90	8,612·5	574·17	2,128·97	365·76	24·38	91·48
1/KK	14	12·45	10,559	754·21	2,604·92	457·71	32·69	114·01
1/LL	15	13·94	9,194	534·82	2,286·71	368·65	21·54	101·63
1/MM	17·26	16·81	11,119·5	648·01	2,451·72	530·53	30·91	114·98
Means	17·69	15·43	10,396·75	587·85	2,442·84	455·25	25·74	106·45

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GLENCOE HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1924.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during February.	Per Cow during February.	Per Cow October to February.	Per Herd during February.	Per Cow during February.	Per Cow October to February.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
3/A	17	16	10,570·5	621·79	4,260·57	434·95	25·59	175·36
3/B	16	15·41	6,334·5	395·91	2,019·46	271·56	16·97	86·19
3/C	12	12	6,873	572·75	3,925·14	293·61	24·47	154·50
3/D	11·38	11·38	7,247	636·81	2,850·85	285·72	25·11	109·31
3/E	15	13·90	10,059·5	670·63	3,138·30	403·44	26·90	130·41
3/F	9	8	4,886·5	542·94	3,453·24	205·35	22·82	136·46
3/G	10	10	6,003	600·30	3,684·20	239·60	23 96	137·39
3/H	16	16	8,772·5	548·28	3,060·99	362·46	22·65	115·44
3/I	14	13·59	6,492·5	463·75	3,120·21	285·80	20·41	128·30
3/J	14·66	14·38	4,994	340·65	2,162·51	242·50	16·54	95·70
3/K	21·10	21	8,961	424·69	3,077·89	427·01	20·24	127·37
3/L	19·24	18·24	7,995	415·54	2,850·96	384·38	19·98	114·17
3/M	14	12·03	4,875	348·21	2,829·67	220·42	15·74	120·67
3/N	20	19	8,033	401·65	2,804·61	389·74	19·49	116·30
3/O	17	15	9,976	586·82	2,730·10	372·88	21·93	97·76
3/Q	59·79	58·79	17,536	293·29	2,954·86	895·86	14·98	119·83
3/R	18	17·10	9,437	524·28	3,553·03	415·70	23·09	150·60
3/S	12	11	4,567·5	380·62	862·24	216·06	18·01	38·58
Means	17·57	16·82	7,978·53	454·23	3,045·89	352·61	20·07	123·22

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TOBACCO IN SOUTH AUSTRALIA.

From the earliest days of the establishment of South Australia, attempts have been made to grow tobacco. On the plains of Adelaide, in the neighboring hills, on Yorke Peninsula, in the North, Tatiara, and in the Millicent district, where something over 30 years ago some Chinese took up land for the purpose, the plant has been cultivated. That the tobacco will thrive in this State appears to have been amply demonstrated, but at no time does it appear that its cultivation approached anywhere near being placed on a commercial footing.

In 1920 a revival of interest occurred as the result of a visit to South Australia of the Tobacco Expert of the Victorian Department of Agriculture (Mr. Temple A. J. Smith). This officer, at the request of the South Australian Department of Agriculture, visited certain localities in the Southern and Hills districts, and, as a result of his inspection, reported favorably on the prospects of this crop in several districts.



Portion of a Crop of Light Plug (Virginian Golden Leaf) Tobacco Grown by Mr. W. A. Gordon, Paris Creek.

Following on this report, the Department of Agriculture cooperated with landholders in the conduct of experimental tests. Of these the most successful was the work done by Mr. W. E. Daddow, at Mount Barker.

During 1921 and 1922 Mr. Daddow grew and cured a quantity of leaf. In 1921, from an area of one-third of an acre, he picked 232½lbs. of leaf (cured weight), which was sold for £26 19s. 1½d., equivalent to a return of £80 17s. 4½d. per acre. In 1922, from one-quarter of an acre, he harvested 130½lbs. of leaf (cured weight),

which was sold for £14 1s. 10½d., equivalent to a return of £56 7s. 6d. per acre. The price secured for first quality leaf each year was 2s. 3d. per lb., with a bonus of 3d. per lb.

The leaf marketed by Mr. Daddow was flue cured, and, so far as can be ascertained, this was the first occasion on which this method of curing had been attempted in South Australia. The process appears to be one involving care and a measure of personal experience on the part of the operator. That it is an absolute essential to the profitable undertaking of tobacco leaf production on a commercial scale, however, is demonstrated by the difference in price paid for flue cured leaf, viz., 2s. 3d. per lb. for first quality, and that paid for the air dried, viz., 7d. per lb.

The results secured at Mount Barker have encouraged the view that tobacco culture presents very favorable prospects in certain parts of the State, and, as a consequence, the Department of Agriculture has endeavored to stimulate interest in it in those localities in which it believes it can be made profitable. With this end in view, during the current season, it has supervised plots, which are being conducted by Mr. P. C. Head, of Woodside, Mr. E. A. Hunt, at Mount Barker, and Mr. W. A. Gordon, of Paris Creek.

These plots were visited during the month by the Director of Agriculture (Professor Arthur J. Perkins), the Secretary of the Advisory Board of Agriculture (Mr. H. J. Finnis), and the Field Officer (Mr. S. B. Opie), who has exercised a direct personal oversight over the cultural operations in each case.

On Mr. Head's property there is an area of 1¾ acres planted to Warne, White Stem Orinoco, and White Burley varieties. The first named is a cigarette and light plug type, and the last named two light plug types. The seed was procured from the South Australian Department of Agriculture, which was courteously supplied with the different types by the Victorian Department of Agriculture last year. The plants were grown in seedbeds 9 sq. yds. in area, the seed having been sown in early September. The plants were lifted on December 15th and set out 3ft. apart in rows at intervals of 3ft. The greater portion of the area was dressed with 2cwts. super, 1cwt. dried blood, and ½cwt. sulphate of potash per acre prior to the planting. Portion of the crop planted without any manurial dressing was much inferior in growth to that which had received an application of super. Subsequent to planting, the crop was cultivated between the rows with the Planet Junior on four occasions.

At the time it was inspected the tobacco generally appeared to be in a thriving condition, although somewhat irregular in growth. There was no indication of disease of any sort. The variety which appeared most promising was Warne. Mr. Head proposes to flue cure the crop, and for the purpose is adapting a shed at present on the holding.

At Mount Barker Mr. E. A. Hunt has an area of approximately 3 acres under the same varieties as are being grown by Mr. Head. Mr. Hunt sowed seed at intervals between October 4th and December

22nd, and commenced planting out on the latter date. The field was dressed with 2cwts. super per acre, 1cwt. dried blood, and ½cwt. sulphate of potash prior to planting, and subsequently cultivated at intervals as occasion required. There is every indication that Mr. Hunt will pick a satisfactory crop, and this he proposes to cure in a concrete barn being erected according to plans prepared by the Department of Agriculture.



Flue Curing Barn Erected by Mr. W. A. Gordon for Flue Curing his Tobacco Crop at Paris Creek.

In addition to Warne, White Stem Orinoco, and White Burley, Mr. W. A. Gordon, of Paris Creek, is growing another variety, Virginian Golden Leaf. He has an area of approximately 3 acres under tobacco. The seed was sown at intervals between September 22nd

and October 7th. The field, which in 1922 carried peas and in 1923 oats, was ploughed up on September 2nd, and subsequently again in the second week of October. On November 10th it was cultivated and harrowed, cross ploughed on November 24th, harrowed down, and a commencement made with planting on November 25th, which was continued at intervals until the middle of January. The Planet Junior was worked freely between the rows until the plants became too large for the operation to be conducted without danger of damaging the plants.

The first picking of the leaves has already been taken and cured out. For this purpose Mr. Gordon has built a barn of red gum slabs and galvanized iron, lined with ruberoid. Heat is generated in two underground furnaces, burning locally grown timber. The process of curing the first barnfull took 3¼ days, and the leaf is now ready for bulking down. Mr. Gordon has adopted the priming method, which consists of picking individual leaves as they ripen, as against the system of cutting the whole plant at the time at which the greater proportion of the leaves have reached maturity.

No feature associated with the tobacco crop in this State this year is more encouraging than the very satisfactory development of the plants in seedbeds. In the neighboring States of Victoria and New South Wales the area planted to tobacco was very much less than would otherwise have been the case because of the shortage of plants occasioned by the development of the fungous pest known as blue mould. This serious pest, so far as can be ascertained, did not appear in any of the seedbeds in South Australia this year. On the contrary, the germination and subsequent growth were such that in each case referred to above the growers had many more plants than were necessary to cover the area which they contemplated planting.

In the fields, likewise, the tobacco is free from disease and, with the exception of very slight damage done by caterpillars, has suffered little damage from insect pests.

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ORCHARD NOTES FOR SOUTHERN DISTRICTS.

[By C. H. BEAUMONT, Orchard Instructor.]

April generally sees the last of gathering the fruit crop. The late varieties of apples are better off the trees than left to the weather. Mark any tree that has shown itself to be worth reproducing; you can then work from it with the certainty of getting something good. With the object of testing suggested methods of controlling scab or *Fusicladium dendriticum*, from a number of trees all the windfalls and leaves were raked into a furrow between the rows of trees and were buried; in another lot of trees the leaves, &c., were raked and picked up and burned; a further trial was made by spraying the fallen leaves and fruit, turning them over as well as could be done quickly. Three years' work showed that to spray the fallen debris or to rake it up and to burn it reduced the quantity of scab by 70 per cent.; raking and burying in a furrow between the rows reduced the infection by 30 per cent. The spray used was "lime sulphur," winter strength. It is also asserted that "downy mildew" can be controlled to a great extent by similar procedure.

Be ready to plant new trees as soon as the nurseryman can lift them. Have the holes open, and a stiff stake driven in the centre of the hole. If making replacements in a grown orchard, cart in new soil for the young tree; a small amount of stable manure or bone dust may be placed in the bottom of the hole before the soil is filled in, but not so as to touch the roots.

Old apricot trees in many parts of the district are losing big limbs. This is caused by root trouble, and an endeavor should be made to loosen the soil deeply about the tree and fertilise it with bone dust or super. Cut the dead or dying limb clean out, and make a clean cut with a sharp knife at the back, then paint with an ashphaltum paint or thick white lead.

Pruning will be commenced; remember that bearing trees require light pruning, the main thing necessary is to do away with cross limbs which are likely to cause damage to the fruit; also remove rough wood which may harbor disease. Sick trees should be grubbed and burned.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, March 12th, 1924, there being present Messrs. C. J. Tuckwell (Acting Chairman), A. M. Dawkins, H. Wicks, F. Coleman, J. W. Sandford, W. J. Colebatch, P. H. Jones, H. S. Taylor, and the Secretary (Mr. H. J. Finnis).

Apologies were received from the Chairman (Mr. W. S. Kelly), the Vice-Chairman (Capt. S. A. White), the President of the R.A. and H. Society (Hon. W. G. Duncan), and the Chief Inspector of Stock (Mr. C. A. Loxton, B.V.Sc.).

Distribution of Seed Wheat.—The Board decided to refer the resolution of the Owen Branch—"That the Government adopt the New South Wales system of distribution of seed wheat"—to the 1924 Annual Congress.

Manufacture of Fruit Cases.—The S.A. Fruitgrowers and Market Gardeners' Association, who were asked to comment on the advisability of making standard fruit cases with soft wood ends, intimated that members of the association were opposed to the proposal. The Board decided to advise the Branch that, as a result of inquiries made, it was of the opinion that no practical good would result from the adoption of the idea.

Inspection of Apples in Packing Sheds.—The Balhannah Branch asked whether arrangements could be made for inspecting in packing sheds apples for export. The Horticultural Instructor reported that he had suggested to the Federal authorities that certain local sheds should be gazetted "appointed places," with the object of testing the idea. The Secretary was directed to ascertain whether the suggestion of the Horticultural Instructor had been adopted.

Horehound as Noxious Weed.—The 1923 Congress of the Agricultural Bureau carried the following resolution:—"That the plant known as 'horehound' should be proclaimed a noxious weed." The resolution was moved by the Gladstone Branch, but before making any suggestions to the Minister, the Board were anxious to obtain local information regarding the prevalence of the plant, and on the motion of Mr. H. S. Taylor, seconded by Mr. H. Wicks, it was decided that the resolution should be brought before the Mid-Northern Conference.

Suggested "School" for Rural Women.—At the 1923 Conference of Lower Northern Branches, the Board was asked to arrange for a short rural household science course of instruction for women. The Secretary submitted suggestions and a draft syllabus, which he had prepared, and on the motion of Mr. F. Coleman, seconded by Mr. W. J. Colebatch, it was decided to seek the approval of the Minister of Agriculture thereto.

Judging Papers at Bureau Meetings.—A communication was received from the Miltalie Branch, intimating that it was proposed to give prizes for papers contributed during the ensuing year, and

asking that the papers should be judged by members of the Advisory Board. The Secretary was instructed to inform the Branch that the Board would undertake to provide judges for this purpose.

Experimental Plots for Tantanoola.—The Tantanoola Branch asked that local experimental plots might be established in order to demonstrate the potentialities of the district in regard to the utilisation of waste water for summer irrigation. It was decided to refer the matter to the Director of Agriculture for a report.

Afforestation.—Mr. F. Coleman gave notice that at the next meeting of the Board he would move—"That the Board recommends the appointment of a Board of Forestry."

Preservation of Timber on River Murray.—Mr. H. S. Taylor, in bringing this matter under the notice of the Board, stated that the impending shortage of timber supplies in the vicinity of the river was causing a good deal of serious concern to the settlers. The Irrigation Commission had control of the timber, and in order that further information should be made available, he moved that the Secretary obtain information with respect to the following points:—(*a*) What are the areas at present under the control of the Irrigation Commission as regards the matter of fuel? (*b*) What is the nature of the control? (*c*) Is it within the competence of Parliament, or the Minister, or any other body, to formulate a policy that will effect

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the preservation wholly and solely in the hands of the Commission [illegible] Parliament has no such control, or in any case if it has or has not, to what extent would the Commission be prepared to consider suggestions from the Advisory Board dealing with the conservation of timber on the river? Motion carried.

Letter of Sympathy to Capt. S. A. White.—On the motion of Mr. A. M. Dawkins, seconded by Mr. H. Wicks, the Secretary was instructed to forward a letter of sympathy to the Vice-Chairman of the Board (Capt. S. A. White), who has been unwell for some time.

Life Membership.—The name of Mr. F. Masters, of the Roberts and Verran Branch, who has been connected with the Agricultural Bureau for 21 years, was added to the roll of life members of the Agricultural Bureau.

New Branches.—Approval was given for the formation of Branches of the Agricultural Bureau at Charra and Brinkworth, with the following gentlemen as foundation members:—Charra—E. T. Mewett, G. W. Denton, F. Haseldine, W. Wright, W. Tudor, W. Schultz, P. Schultz, E. A. Payne, A. Haseldine, A. J. Hantke, G. Tudor, R. Tudor, E. O. Wahl, S. Osborn, F. B. Haseldine, L. Dunnet, G. Brooks, J. Schultz, E. A. Denton. Brinkworth—G. E. Ottens, P. H. Ottens, C. A. Ottens, C. C. T. Ottens, J. H. Ottens, O. F. Ottens, W. F. Ottens, G. L. Everett, J. S. Weckert, W. J. Wilke, E. J. Hoepner, W. R. W. Graham, S. T. Wooldridge, C. A. Waldhuter, T. G. Chesson, E. I. Chesson, Geo. Adams, F. W. Heinrich, F. A. Klem.

Branch to be Closed.—It was decided to close the Northfield Branch.

New Members.—The following names were added to the rolls of existing Branches:—Murray Bridge—E. B. Thiele, J. G. Lehmann, — Cooke; Poochera—T. McCormick, S. E. Laird, J. Ward, W. E. Smart; Waikerie—P. D. Henderson, G. H. Fullwood, G. A. Reaby; Mannanarie—H. W. Lang, W. Harding & Sons, S. Hall, A. Campbell; Renmark—G. E. A. Russell, W. K. Tamblyn, W. E. Mount, V. T. McLean, H. H. Hillstone; Kringin—H. J. Palmer, C. S. Carter; Paskeville—A. G. Bussenschutt, W. H. Price, G. H. Couyner; Tweedvale—A. B. Schapel, W. O. Pfeiffer, P. E. Henschke, H. T. Henschke, G. A. Mieglick, E. W. Smith, H. J. Boerth, C. A. H. Schoell, L. L. Watkins; Mount Gambier—A. Stafford, C. Kennedy; Nelshaby—J. C. Hartnett; Lameroo—F. J. Duffet, L. A. Cornish; Clare—C. F. Johncock; Rockwood—K. R. Holdsworth; Talia—N. Boylan; Mount Barker—A. Henningson, — Jenner; Georgetown—E. E. Lang, W. H. O. Cronk, F. W. Phillips, D. M. Davoren; Tantanoola—G. S. Hann; Booleroo Centre—R. F. Fitzgerald; Lyndoch—H. G. Fiebig, A. Linton; Currency Creek—N. Holme, S. E. Skewes; Monarto South—E. Zeunert; McLachlan—Rev. Owen, J. Lightfoot, R. Priest; Petina —F. E. Sansome, S. Milman, W. Nunn, J. McCormack; Roberts and Verran—A. Smith; Light's Pass—A. Schmidt, C. Schultze, W. Patching, W. Cuitz; Mundalla—R. Dinning, J. Haynes; Shoal Bay—R. L. Turner, O. Turner.

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A. SAIDE, A.F.I.A., Secretary (Late of Federal Taxation Dept.).

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., FEBRUARY, 1924.

Imports.

Interstate.

Apples (bushels)	59
Bananas (bushels)	10,576
Lemons (bushels)	2
Mangoes (bushels)	3
Oranges (bushels)	1
Passion fruit (bushels)	40
Peaches (bushels)	1
Pines (bushels)	882
Plums (bushels)	2
Tomatoes (bushels)	2
Onions (bags)	2,182
Potatoes (bags)	4,823
Bulbs (packages)	22
Plants (packages)	8
Seeds (packages)	46
Wine casks, empty (number)	3,808

Rejected—153bush. bananas, 1bush. apples, 2bush. tomatoes, 3 secondhand cases.

Fumigated—33 wine casks.

Overseas.

Federal Quarantine Act.

Seeds, &c. (packages)	4,917

Exports.

Federal Commerce Act.

Twenty-five packages dried fruit, and 1551 packages apples were exported to overseas markets. These were consigned as follows:—

London.

Apples	1,235

India and East.

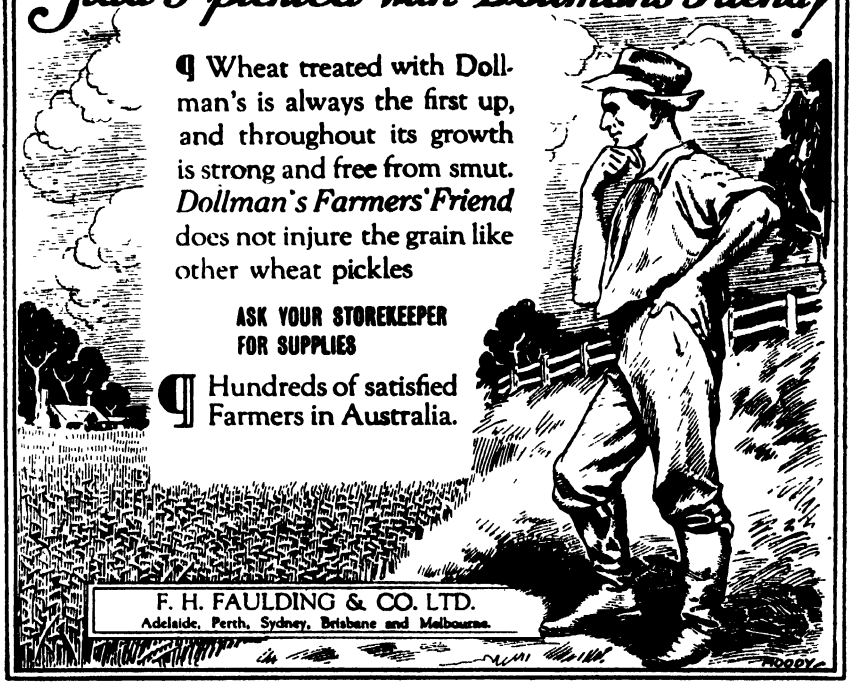
Apples	316
Dried fruit	25

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THE)OK

REPORTS FOR THE MONTH OF MARCH.

The following reports on the general Agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective Managers:—

Kybybolite.—Weather has been fairly seasonable, although temperatures generally have been lower than usual for the month, and the rainfall has been above the average. Two nice rains were recorded,—one early, and one later in the month. Over 5in. of rain have now been received for the first three months of the year, a record for this period of the year for the Farm. Crops—Good areas have been prepared during the month for this year's cereals and for sowing to subterranean clover. Turnip crops have grown really well during the month, as also have mangels and lucerne under irrigation. Subterranean clover germinated really well from the February rains, and has grown splendidly during March. Natural feed is very plentiful, and nice and green.

Eyre's.—Weather—Thirty points of rain for the month over three raining days. Winds very changeable and bad for burning generally. Weather generally cool, with odd warm days and several misty mornings. Crops—Have not heard of any settlers having started seeding, other than a few acres of barley for green feed. Clearing and ploughing are general, and seeding will soon be in full swing. Quite a fair amount of the area to be cropped this year cannot be ploughed until rain comes. Quite a number of settlers are water carting. Natural Feed—All very much dried off and of little feeding value. Stock—All stock are in very good order. Pests—Rabbits are numerous, but settlers have been poisoning, which should be very useful considering there is little for the rabbits this dry weather. Miscellaneous—There are prospects of a large area being seeded in this district.

Turretfield.—Weather—The weather this month has been remarkably cool, and many days were damp and cloudy; 127 points of rain were registered. Crops—The grape crop is very late and picking is only just beginning. In some vineyards the fruit is hardly ripe. Natural Feed—There is very little natural feed; the rains made the grass shoot, but no growth has been made. Pests—Stinkweed has made very strong growth and is giving trouble to those breaking up stubble land. Miscellaneous—Farmers are busy cleaning up the fallows as weeds are very thick this year.

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DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, reported on April 1st, 1924:—

BUTTER.—Supplies have kept up remarkably well throughout the month just ended, and instead of there being a shortage of local top-grade butter as usual in other years, the production in this State has been sufficient to meet requirements. There has also been a small surplus available for export, which is being sold or consigned to London. There is a shrinkage, however, now taking place in supplies each week and top grades may have to be augmented by importations from the Eastern States at an early date. Values are lower in sympathy with the rates obtaining in London, and also because of the markets in Victoria, New South Wales and Queensland having eased. Values being:—Choicest factory and creamery fresh butter, in bulk, 1s. 3½d.; first-grade bulk, 1s. 2½d.; second and third grade bulk, 10d. to 10½d.; best separators and dairies, 1s. 1½d. to 1s. 3d.; fair quality, 1s. ½d. to 1s. 1d.; store and collectors' lines, 11d. to 1s. ½d.; heated lots, 10d. to 10½d.

EGGS.—Values are now considerably firmer than when last reported, the usual seasonable advance having taken place. Supplies are now shrinking, so that higher figures may be looked for as the winter approaches. Quotations at the end of month:—Fresh hen, 1s. 5½d.; duck, 1s. 6½d. per dozen.

CHEESE.—Unfortunately, there has been a slump in prices in connection with this commodity. Each of the producing States has a surplus above local requirements, and it looks as though fairly heavy quantities will have to be shipped to London to ease the position. The market there is also somewhat over-supplied, and values are lower than have ruled for some time past. The range here is now 8½d. to 10d. per lb.; semi-matured to matured, 11d. to 1s.

HONEY.—A firming in rates of top-grade honey eventuated in the early part of the month, resulting in better supplies coming to hand, and prime clear extracted, in liquid condition, is now selling at 5d. to 5½d.; best quality candied lots 4½d. to 5d.; lower grades, 2½d. to 3d.; beeswax, readily saleable at 1s. 4d. to 1s. 4½d. per lb.

ALMONDS.—A better turnover was experienced towards the end of the month, export buyers operating fairly extensively. Values range at present as follows:—Brandis, 8½d. to 9d.; mixed softshells, 7½d. to 8d.; hardshells, 4d. to 4½d.; kernels, 1s. 7½d. to 1s. 8d.

BACON.—With values ruling high for the live animal, rates are again firmer. Supplies of local middles are short of requirements, and there is a better call for Hutton's "Pineapple" brand in consequence. Best factory cured sides, 1s. 4d. to 1s. 4½d.; best factory cured middles, 1s. 8d. to 1s. 8½d.; best factory cured rolls, 1s. 3½d. to 1s. 4d.; hams, 1s. 7d. per lb.; Hutton's "Pineapple" brand hams, 1s. 8d. per lb. Lard.—Hutton's "Pineapple" brand lard, in packets, 1s.; in bulk, 11d. per lb.

LIVE POULTRY.—The quantities marketed at each sale have been fairly heavy, but there is still a demand for much larger supplies. For any stock which were in prime condition excellent prices were realised, whilst for medium and poorer sorts values well maintained. As poulterers, restaurant keepers, and produce dealers are expecting an extra heavy call for Easter, consignors would be well advised to forward supplies straight away as satisfactory rates are sure to rule. Crates obtainable on application. The following values ruled at our last auction:—Prime roosters, 5s. to 7s. 3d. each; nice condition cockerels, 3s. to 4s. 9d. each; Poor condition cockerels, 2s. to 2s. 9d.; plump hens, 3s. 3d. to 5s.; medium hens, 2s. 6d. to 3s.; light hens, 2s. to 2s. 3d.; geese, 5s. 6d. to 6s. 6d.; ducks, good condition, 4s. to 6s. 3d.; ducks, fair condition, 2s. 6d. to 3s. 9d.; turkeys, good to prime condition, 1s. 2d. to 1s. 8d. per lb. live weight; do., fair condition, 1s. to 1s. 1½d. per lb. live weight; do. fattening sorts, lower; pigeons, 7d. to 11½d. each.

POTATOES.—Prime new Victorian potatoes at 8s. to 9s. per cwt. on rail, Mile End.

ONIONS.—Best quality onions at 9s. 6d. per cwt. on rail.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month of and to the end of March 1924, also the average precipitation to the end of March, and the average annual rainfall.

Station	For March, 1924.	To end March, 1924.	Av'ge To end March, 1924	Av'ge Annual Rainfall
Far North and Upper North.				
Oodnadatta	—	0·74	1·90	4·94
Marree	—	1·02	1·43	6·07
Farina	0·01	0·82	1·74	6·66
Copley	—	0·81	1·94	8·39
Beltana	—	0·52	2·19	8·97
Blinman	—	0·92	2·60	12·53
Tarcoola	0·12	1·45	1·81	7·74
Hookina	—	0·86	2·05	13·46
Hawker	0·04	0·95	1·88	12·92
Wilson	—	1·55	1·98	12·58
Gordon	0·19	1·77	2·34	11·55
Quorn	0·21	1·80	2·03	14·21
Port Augusta	0·36	2·92	1·84	9·67
Port Augusta West	0·37	2·68	1·75	9·71
Bruce	0·22	1·90	2·04	10·77
Hammond	0·31	2 32	2·11	11·91
Wilmington	0 22	3 14	2·39	18·39
Willowie	0·27	2 76	2·31	12·57
Melrose	0·41	4·13	3·27	23·40
Booleroo Centre	0·38	3 03	2·14	15·65
Port Germein	0·43	2·77	1·95	12·89
Wirrabara	0 49	3·58	2·41	19·78
Appila	0 52	4 95	2·05	15·00
Cradock	0·05	1·15	1·93	11·52
Carrieton	0·39	2·13	2 07	12·90
Johnburg	0·45	1·67	1·80	10·91
Eurelia	0 23	1·86	2·16	13·54
Orroroo	0·23	1·64	2·40	13·73
Nackara	0·25	1·37	2·45	11·99
Black Rock	0·26	1·90	2·18	12·75
Ucolta	—	1·35	2·22	12·04
Peterborough	0·39	2·26	2·27	13·53
Yongala	0·36	2·67	2·08	14·58
Lower North-East.				
Yunta	0·05	0·96	2 01	8·88
Waukaringa	—	1·61	1·81	8·54
Mannahill	0·07	0·70	2·02	8·67
Cockburn	—	1·39	1·86	8·31
Broken Hill, N.S.W.	0·12	1·23	2·16	9·98
Lower North.				
Port Pirie	0·69	3·35	1·99	13·55
Port Broughton	0·45	2·96	1·81	14·29
Bute	0·79	2·50	1·84	15·78
Laura	0·41	5·71	2·26	18·26
Caltowie	0·46	3·39	2·26	17·20
Jamestown	0·60	3·88	2·20	17·89
Bundaleer W. Wks.	0·79	4·99	2·14	18·09
Gladstone	0·71	4·86	2·03	16·29
Crystal Brook	0·72	5·24	2·00	15·95
Georgetown	0·51	4·72	2·25	18·55
Narridy	0·51	3·11	2·06	16·37
Redhill	0·41	2·75	1·98	16·94

Station	For March, 1924	To end March, 1924	Av'ge To end March, 1924.	Av'ge Annual Rainfal
Lower North—*continued.*				
Spalding	0·65	4·14	2·26	20·27
Gulnare	0·65	4·90	2·15	19·36
Yacka	0·48	3·88	1·76	15·48
Koolunga	0·51	3·19	1·98	15·89
Snowtown	0·63	2·76	1·90	16·07
Brinkworth	0·48	3 02	1·96	16·30
Blyth	0·52	4·68	2·07	17·03
Clare	0·63	5·28	2·72	24·68
Mintaro	0·60	4·13	2·34	23·57
Watervale	0·73	5·00	2·86	27·54
Auburn	0·71	4·48	2·97	24·35
Hoyleton	0·58	3·46	2 03	17·91
Balaklava	0·89	3·36	2·05	15·95
Port Wakefield	1·08	4·08	2·21	13·28
Terowie	0·52	2·04	2·24	13·82
Yarcowie	0·26	1·87	2·29	14·22
Hallett	0 69	3·64	2·01	16·49
Mount Bryan	0·66	4·49	2·04	16·81
Kooringa	0·58	3·96	2·33	18·09
Farrell's Flat	0·40	3·99	2·18	19·00
West of Murray Range.				
Manoora	0·59	3·71	2·09	18·92
Saddleworth	0·50	3·64	2·46	19·78
Marrabel	0·52	3·61	2·22	19·78
Riverton	0·67	3·66	2·53	20·79
Tarlee	0·96	3·50	2·26	17·93
Stockport	0·96	3·29	2·19	16·63
Hamley Bridge	1·05	4·51	2·25	16·59
Kapunda	0·88	4·25	2 60	19·89
Freeling	1·13	3·47	2·33	17·99
Greenock	1·07	3·71	2·51	21·68
Truro	0·81	3·58	2·45	20·20
Stockwell	0·63	3·78	2·41	20·32
Nuriootpa	1·10	3·28	2·45	21·00
Angaston	0·94	3·63	2·58	22·53
Tanunda	0·90	3·77	2·62	22·24
Lyndoch	1·35	4·14	2·33	22·93
Williamstown	1·39	3·51	2·61	27·48
Adelaide Plains.				
Mallala	1·50	3·75	2·11	16·72
Roseworthy	1·29	3·73	2·16	17·35
Gawler	1·43	4·93	2·37	19·11
Two Wells	1·60	4·25	2·02	15·88
Virginia	1·64	3·71	2·09	17·32
Smithfield	1·52	4·30	2·22	17·24
Salisbury	1·81	4·12	2·35	18·51
North Adelaide	2·41	6·65	2·64	22·37
Adelaide	2·07	5·42	2·41	21·08
Glenelg	1·77	4·23	2·31	18·45
Brighton	1·93	4·63	2·63	21·37
Mitcham	2·07	5·16	2·54	24·26
Glen Osmond	1·93	4·61	2·69	25·94
Magill	2·01	6·03	2·86	25·35

RAINFALL—*continued.*

Station.	For March, 1924.	To end March, 1924.	Av'ge To end March, 1924.	Av'ge. Annual Rainfall
Mount Lofty Ranges.				
Teatree Gully.....	1·73	5·67	3·08	27·77
Stirling West	2·62	9·37	4·53	46·82
Uraidla	2·05	7·85	4·39	44·23
Clarendon	2·48	6·15	3·52	33·09
Morphett Vale ...	2·74	6 01	2·68	22·90
Noarlunga	2·68	6·33	2·31	20·41
Willunga	2·45	6·43	2·78	25·99
Aldinga	1·61	4·71	2·41	20·44
Myponga.....	1·82	6·70	2·85	29·80
Normanville	1·50	5·13	2·17	30·70
Yankalilla.....	1·61	5·34	2·62	23·31
Mount Pleasant ..	1·26	3 07	2·82	27·28
Birdwood	1·49	3·40	2·98	29·39
Gumeracha	1·77	5 04	3·25	33·36
Millbrook Reservoir	1·85	6·29	3·41	36·21
Tweedvale	2·17	5·48	3·18	35·65
Woodside	1·72	4·93	3·16	32·20
Ambleside.....	2·05	6·22	3·39	34·82
Nairne	1·68	4·82	3·26	28·44
Mount Barker	1·83	5·20	3·38	31·30
Echunga	2·18	5·61	3·46	33·06
Macclesfield	1·94	4·93	3·24	30·65
Meadows	2·99	8·18	3·77	36·19
Strathalbyn	1·87	4·61	2·50	12·36
Murray Flats and Valley.				
Meningie	2·72	5·41	2·34	18·74
Milang	1·78	3·81	2·05	15·45
Langhorne's Creek.	1·78	3·86	2·01	14·77
Wellington	2·13	3·89	2·20	14·80
Tailem Bend	1·93	4·16	2·36	14·68
Murray Bridge ...	1·27	3·18	2·14	13·94
Callington	1·42	3·29	2·18	15·49
Mannum	1·27	2·70	1·89	11·66
Palmer	0·81	1·69	2·20	15·46
Sedan	0·58	2·10	1·84	12·27
Swan Reach	1·06	2·58	2·00	11·06
Blanchetown	0·91	2·34	1·85	10·09
Eudunda.....	0·46	2·54	2·23	17·51
Sutherlands	0·84	2·47	1·60	11·20
Morgan	0·73	2·54	1·51	9·30
Waikerie	0·61	3·32	1·84	9·87
Overland Corner ..	1·17	2·50	2·01	11·03
Loxton	0·86	3·02	2·78	12·50
Renmark	0·75	2·49	2·06	11·06
Monash	1·08	2·78	—	—
West of Spencer's Gulf.				
Eucla.....	0·56	1·18	2·03	10·01
White Well.....	0·91	1·98	1·44	9·20
Fowler's Bay	0·56	1·77	1·38	12·14
Penong	0·87	3·31	1·66	12·53
Ceduna	0·34	2·04	1·34	10·25
Smoky Bay	0·34	1·40	1·34	10·98
Petina	0·56	1·68	1·47	12·95
Streaky Bay.....	0·75	1·61	1·55	18·07

Station.	For March, 1924.	To end March, 1924.	Av'ge To end March, 1924.	Av'ge. Annual Rainfall
West of Spencer's Gulf—*continued.*				
Talia	0·76	1·60	1·33	15·32
Port Elliston	0·88	1·84	1·36	16·56
Cummins	0·40	1·19	1·28	18·56
Port Lincoln	0·48	1·74	1·96	19·66
Tumby	0·20	0·71	1·57	14·56
Carrow	0·24	0·77	1·96	14·42
Arno Bay	0·24	1·40	1·94	13·06
Cowell	0·44	1·65	1·91	11·63
Minnipa.....	0·29	2·23	2·59	15·51
Yorke Peninsula.				
Wallaroo	1·15	3·04	1·88	14·15
Kadina	0·90	2·70	1·92	16·02
Moonta	1·14	3·43	1·92	15·35
Green's Plains	1·01	2·93	1·79	15·86
Maitland	1·36	6·35	2·09	20·17
Ardrossan	0·91	3·19	1·76	14·18
Port Victoria	0·79	3·31	1·66	15·50
Curramulka	1·01	3·73	2·05	19·20
Minlaton	0·45	2·86	1·90	17·90
Brentwood	0·62	3·28	1·76	15·83
Stansbury	0·71	2·84	1·91	17·01
Warooka	0·66	2·87	1·69	17·80
Yorketown	1·35	3·27	1·72	17·24
Edithburgh	0·76	3·35	1·90	16·58
South and South-East.				
Cape Borda.....	0·96	3·04	2·07	25·08
Kingscote	0·49	1·80	1·84	19·04
Penneshaw	0·29	1·80	2·07	19·47
Victor Harbor	1·43	3·51	2·50	21·49
Port Elliot	1·33	3·51	2·43	20·12
Goolwa	1·08	3·60	2·36	17·89
Pinnaroo	1·19	2·98	2·64	15·50
Parilla	0·86	2·72	1·79	14·51
Lameroo	1·59	4·48	2·08	16·32
Parrakie	1·22	3·30	1·86	14·58
Geranium	1·48	3·81	2·00	16·62
Peake	2·27	4·69	2·58	16·73
Cooke's Plains ...	2·40	4·90	2·07	15·14
Coomandook	2·43	4·92	2·14	17·49
Coonalpyn	2·37	5·39	2·06	17·40
Tintinara	2·21	4·92	2·09	18·70
Keith.....	1·65	4·57	2·15	18·22
Bordertown	1·99	5·60	2·23	19·39
Wolseley	1·35	5·15	1·97	18·12
Frances	1·21	4·44	2·31	19·73
Naracoorte	2·40	5·96	2·53	22·56
Penola	2·13	5·01	3·09	26·26
Lucindale	2·01	6·02	2·31	23·00
Kingston.....	2·27	5·08	2·41	24·51
Robe	1·62	4·39	2·52	24·69
Beachport.....	1·65	3·87	2·94	27·20
Millicent	1·79	5·29	3·26	29·39
Kalangadoo	2·78	7·57	3·11	32·47
Mount Gambier ..	1·88	5·91	3·76	31·29

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings	
		April.	May.
Alawoona	*	—	—
Aldinga	*	—	—
Allandale East	†	11	23
Amyton	*	—	19
Angaston	*	—	—
Appila-Yarrowie	*	—	—
Arthurton	†	—	—
Ashbourne	*	—	—
Balaklava	*	12	10
Balhannah	†	11	9
Barmera	916	—	19
Beetaloo Valley	*	14	19
Belalie North	*	19	17
Berri	*	23	21
Bethel	†	—	—
Big Swamp	*	—	—
Blackheath	*	—	16
Black Springs	*	15	13
Blackwood	926	—	19
Block E	*	—	—
Blyth	*	5	3
Booleroo Centre	†	—	16
Borrika	*	—	—
Brentwood	†	17	15
Brinkley	†	19	17
Bundaleer Springs	*	—	—
Bute	*	15	13
Butler	†	—	—
Calca	*	—	—
Cadell	*	—	—
Canowie Belt	*	—	—
Carrow	*	16	14
Cherry Gardens	†	15	13
Clanfield	*	—	—
Clare	†	11	16
Clarendon	*	14	12
Claypan Bore	*	23	21
Cleve	*	16	14
Collie	915	—	17
Colton	*	25	30
Coomandook	*	16	14
Coonalpyn	†	—	16
Cradock	*	—	—
Crystal Brook	*	19	17
Cungena	*	—	—
Currency Creek	926	—	16
Cygnet River	921	17	15
Darke's Peak	*	—	—
Denial Bay	*	—	—
Edillilie	*	26	31
Elbow Hill	*	22	20
Eurelia	*	—	—
Farrell's Flat	*	—	—
Frances	*	26	31
Gawler River	*	—	19
Georgetown	†	19	17
Geranium	*	26	31
Gladstone	*	—	16
Glencoe	*	—	—
Glossop	*	23	21
Goode	*	23	21
Green Patch	910	—	19
Gumeracha	*	—	19
Halidon	*	—	—
Hartley	*	16	14
Hawker	*	22	20
Hilltown	*	—	—
Hookina	905	17	15
Inman Valley	*	—	
Ironbank	*	19	17
Kadina	*	—	—
Kalangadoo (Women's)	926	12	10
Kalangadoo	*	12	10
Kangarilla	926	—	16
Kanmantoo	*	19	17
Keith	*	—	—
Ki Ki	*	—	—
Kilkerran	*	17	15
Kimba	*	—	—
Kingston-on-Murray	*	—	—
Kongorong	*	17	15
Koonibba	*	—	16
Koppio	*	14	19
Kringin	*	—	—
Kybybolite	*	17	15
Lake Wangary	910	19	17
Lameroo	*		16
Laura	*	19	17
Lenswood and Forest Range	*	—	—
Light's Pass	†	—	—
Lipson	†	—	—
Lone Gum and Monash	*	16	14
Lone Pine	*	—	—
Longwood	*	—	—
Loxton	*	—	—
Lucindale	*	—	—
Lyndoch	909	17	15
McLachlan	*	—	—
McLaren Flat	924	—	—
MacGillivray	922	15	13
Maitland	*	17	15
Mallala	*	—	19
Maltee	†	—	16
Mangalo	*	—	—
Mannanarie	*	17	15
Marama	*	—	—
Meadows	*	16	14
Meningie	*	—	—
Milang	*	12	10
Millicent	*	5	3
Miltalie	†	19	17
Mindarie	*	7	5
Minlaton	*	—	16

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Branch.	Report on Page	Dates of Meetings. April.	May.	Branch.	Report on Page	Dates of Meetings. April.	May.
Minnipa	*	16	14	Roberts and Verran	‡	17	15
Monarto South	*	—	—	Rockwood	926	—	19
Moonta	910	—	16	Rosedale	909	—	—
Moorak	*	17	15	Rosy Pine	*	—	—
Moorlands	*	—	—	Saddleworth	909	—	—
Moorook	*	—	19	Saddleworth (Women's)	‡	15	13
Morchard	‡	19	17	Salisbury	*	1	6
Morphett Vale	*	17	22	Salt Creek	*	—	—
Mount Barker	‡	16	14	Sandalwood	*	—	—
Mount Bryan	*	—	—	Shoal Bay	*	15	13
Mount Byran East	*	—	—	Smoky Bay	*	19	17
Mount Compass	*	—	—	Spalding	*		—
Mount Gambier	*	12	10	Stockport	‡	16	—
Mount Hope	*	19	17	Streaky Bay	*	—	—
Mount Pleasant	†	—	—	Strathalbyn	*	15	13
Mount Remarkable	*	—	—	Talia	915	14	12
Mount Schank	*	22	13	Tantanoola	928	19	17
Mundalla	*	16	14	Taplan	*	15	13
Murray Bridge	916	—	—	Tarcowie	‡	15	13
Mypolonga	‡	16	14	Tarlee	*	—	—
Myponga	*	—	—	Tatiara	‡	19	17
Myrla	916	19	17	Tweedvale	*	24	15
Nantawarra	‡	17	15	Two Wells	*	-	—
Naracoorte	‡	12	10	Uraidla & Summertown	*	7	5
Narridy	*	19	17	Veitch	*	—	—
Narrung	*	19	17	Virginia	*	—	—
Neeta	*	—	—	Waikerie	*	—	—
Nelshaby	905	19	17	Wall	*	—	—
Netherton	‡	—	16	Wanbi	*	—	—
New Residence	‡	—	—	Warcowie	‡	—	11
North Booborowie	*	15	13	Watervale	*	—	—
North Bundaleer	*	—	—	Weavers	‡	14	19
Northfield	*	—	-	Wepowie	‡	15	13
Nunkeri and Yurgo	*	6	4	Whyte-Yarcowie	906	—	—
O'Loughlin	*	16	14	Wilkawatt	*	19	17
Orroroo	*	19		Williamstown (Women's)	909	2	7
Owen	‡	18	16	Williamstown	908-9	18	16
Parilla	*	—	16	Willowie	*	16	14
Parilla Well	*	—	19	Wilmington	*	16	14
Parrakie	*	—	—	Windsor	*	—	—
Paruna	*	—	—	Winkie	*	—	—
Paskeville	*	—	16	Wirrabara	†	—	—
Pata	*	—	—	Wirrega	*	—	—
Penola	927	5	3	Wirrilla	*	19	14
Petina	‡	26	24	Wirrulla	912	—	—
Pinnaroo	*	19	10	Wolowa	*	—	—
Pompoota	*	9	14	Wookata	914	—	—
Poochera	912	5	10	Wudinna	*	—	—
Port Broughton	*	—	16	Wynarka	916	—	—
Port Elliot	926	16	21	Yacka	*	15	13
Port Germein	*	26	24	Yadnarie	*	15	13
Pygery	‡	19	17	Yallunda Flat	*	—	—
Ramco	‡	—	19	Yaninee	*	—	—
Rapid Bay	‡	5	3	Yeelanna	‡	19	17
Redhill	906	-	—	Yongala Vale	*	—	—
Rendelsham	*	16	14	Yorketown	*	—	—
Renmark	*	17	15	Younghusband	916	17	23
Riverton	*	—	—				
Riverton (Women's)	*	—	—				

* No report received during the month of March. ‡ Held over until next month. † Formal.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

HOOKINA (Average annual rainfall, 12in.).

February 21st.—Present: nine members and six visitors.

FEEDING AND REARING PIGS.—A paper dealing with this subject was read from the *Journal of Agriculture*, and in the discussion that followed Mr. B. Murphy said that if the farmer kept a good line of pigs and treated them properly they could be turned to profitable account. He favored weaning the pigs when they were about six weeks old. When the pigs reached the age of six months they should be in prime condition for killing for bacon. In curing the bacon he used a mixture of one part of sugar to two parts of salt and a small quantity of saltpetre. Mr. J. O'Connor considered the Tamworth an excellent breed of pigs for the bacon trade, because they were good "doers" and the skin was not tough.

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

NELSHABY.

October 21st.—Present: 13 members.

WINTER FORAGE OR CATCH CROPS.—In the course of a paper dealing with this subject Mr. L. C. Roberts said larger areas could be devoted to winter forage or catch crops, with benefit to the stock and profit to the owners. By sowing portion of the stubble ground for feed early in the season a larger quantity of first-class feed per acre could be obtained. It would also enable the farmer to top-up surplus stock and weaner lambs a little earlier than the bulk of stock that were fed on natural pastures, and so obtain the best prices in the market, which was usually bare of fat stock early in the winter. Sown pastures would carry considerably more stock than natural pastures, and as a consequence, it would take a smaller area of land to maintain the farm stock. In addition to that, a larger proportion of the farm could be devoted to wheat and fallow. The forage crops should be sown early, in order not to interfere with the main crop of wheat. Crops sown for stock should receive the same quantity of manure as that used for the main crops. His experience had been that there was no fodder to equal the six-row barley of the Cape type. If more were sown than was required for green feed, the stock could be kept off the crop from about September, and it would usually give a good yield of grain, which could be profitably utilised for most farm stock. Rye was good for very early feed, but the seed was difficult to obtain. Oats were also good for late feed, and after most of the natural pastures were dry and barley past its prime, the oat crop would be at its best. It was

an excellent stock-fattening crop. If not wanted as green feed, oats made excellent hay, and the grain could with advantage be added to the food of the horses, and it was equal to bran for feeding to milking cows. An oat crop tended to starve out take-all and thus improved the soil for wheat. Rape was a good crop for sheep and dry cattle, but it was necessary to have small paddocks so that the stock could be enclosed on the crop until they became accustomed to it. Experiments should be conducted with peas in the Nelshaby district for fodder. If a portion of the fallow were sown with peas they would prove profitable. They enriched the land to such an extent that many farmers held the opinion that land that had carried a crop of peas in the previous season was equal to fallow for wheat-growing. In the discussion that followed, Mr. F. Jose stated that barley had given him best results for an early fodder crop. Peas also did very well, but he had found that the stock did not take to them too readily. Peas were an excellent crop for enriching the soil.

PREPARING STUBBLE LAND FOR SEEDING.—At a further meeting held on January 19th the following paper was read by Mr. T. D. Haines:—"As early as possible after harvest the stubble should be burnt. If it is not thick enough to carry a fire, use a fire-rake or fire-harrows. The land should then be worked with a share cultivator to a depth of not less than 3in. I prefer the share to the disc-cultivator, because the former leaves the rubbish on the surface. If the stubble is turned in it tends to encourage the development of takeall, and another objection is, that at seeding-time the straw blocks the combine. If rain falls early, work the land a second time before seeding. Should summer weeds make too rank a growth for a spring-tooth cultivator, a disc implement can be used. It is advisable to rake the rubbish and burn it in the hot weather if possible, because if it is left until seeding time it becomes wet, is difficult to burn, and causes a lot of trouble and delay. In the discussion that followed, Mr. P. Noble stated that where the land was inclined to drift it was a debatable point as to whether it was advisable to burn the stubble. He suggested sowing oats on land that showed evidence of take-all. Mr. Haines, in reply to a question, stated that Florence had given the best results of all the varieties of wheat he had sown on stubble land.

WHYTE-YARCOWIE (Average annual rainfall, 13.91in.).

February 23rd.—Present: five members.

HARVEST REPORTS.—Mr. E. J. Pearce, in relating his experiences during the 1923-24 harvest, said too much rain had fallen during the year to enable farmers to obtain the best results, and the crops on the best land seemed too soft to stand any hardship. The best wheat on his farm was Federation, the next Major, and then Florence and Currawa about equal. He noticed a fair amount of take-all, especially on loose land. Flag smut was also prevalent, and one piece of wheat had a fair amount of ball smut, although all the seed was treated with the same strength of pickle. Mr. J. Walsh reported that crops were looking particularly well up to November, when black rust appeared and did much harm, especially to Federation and Major. Federation and Major gave the best yields, followed by King's White. Mr. G. McGregor reported that crops generally did not come up to expectations. His crops suffered a good deal from frost. One paddock carried a fair amount of ball smut, although the seed sown was pickled and quite free from smut. Mr. S. Robinson stated that in two paddocks that he had sown the seed received similar treatment. One paddock was very badly affected with ball smut and the other was practically free. He also had a good deal of flag smut. Mr. T. Keatley said flag smut was in evidence in his crops. The crops came up splendidly, but went back about the time hay cutting was commenced, and within a short time there were patches of land several yards in extent that were absolutely devoid of crop.

REDHILL, February 26th.—Thirteen members and visitors attended the meeting, when points of interest bearing on the 1923-24 harvest were brought before the meeting, and an interesting discussion ensued.

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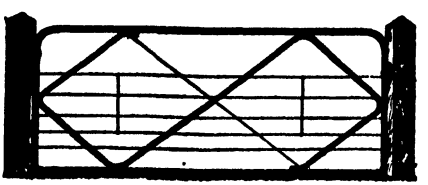


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LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

WILLIAMSTOWN.

December 21st.—Present: 18 members.

BUILDING.—Mr. A. Bain read the following paper:—"The man who contemplates building a house should first give consideration to the selection of the site. It is necessary to place the house upon a spot that is well drained, because nothing is more detrimental to a structure than to have water continuously seeping under the foundations. The next point is to test the nature of the soil upon which the building is to be placed. Should the surface be loose or defective in any way, it would be advisable to cut a trench the full width of the wall, until solid ground is reached. This trench should be filled in with good concrete, consisting of about seven parts of good sharp sand and rubble to one part of cement, reinforced with ⅜in. rods placed close to the bottom of the trench. Lime concrete may be used instead of the cement. In some cases the building site may prove to be firm and solid, and it will not be necessary to use concrete in the foundation. Where this obtains, the foundation can be built with ordinary masonwork. Care should be taken in levelling the top of the foundation, in order to form an even surface to take the floor-plates. When the foundations are completed, they should be covered with a damp course, consisting of heated sand and tar, thoroughly mixed and placed on the wall to a thickness of about ½in., to prevent moisture creeping up the walls. All masonwork should be laid down in courses, bedded in good mortar and well hammered down, and, if possible, 'throughers' should be used, at least one to every yard of masonwork. All door frames should be carefully set, true and level, with the top of the sill about 7in. above plate level. The sills should only bear on each end in order to prevent buckling. If brick quoins are used, all bricks should be thoroughly wetted before being used, because mortar will not adhere to a dry brick. All brickwork should be struck as the work rises, unless the openings are to be cement rendered, when all the joints should be raked out to give a key for the cement. All mason work should be flushed on the inside and the joints raked out on the outside ready for pointing. If board floors are to be used, ventilators should be built in on the plate levels, to allow a free passage of air to circulate under the floors. All frames should be securely strapped with hoop iron nailed to the frame and built into the wall, to prevent the frames working loose. Lintels should be formed over all openings, and should consist of cement concrete run into moulds and reinforced with ⅜in. rods. If brick arches are used, they should be set in cement compo. Should the foundations prove to be faulty it is advisable to run a reinforced cement band around the building over the top of all openings. This considerably adds to the strength of the building and the common practice of bolting a house afterwards is avoided. When within about 18in. of the top of the walls, hoop iron or wire ties should be built in to secure the roof, and the top of the wall should be carefully levelled to take the wall-plate. When the walls are completed, pointing can be carried on. Mortar for pointing should be mixed thoroughly from sand that has been screened, and fresh burnt lime, and should be left to temper at least 12 hours before being used. Pointing must be well bagged off, and if it is to be lined, it should be jointed before the mortar becomes dry. All window-sills should have a cement finish and at least a 3in. weathering to prevent water driving under the sills. If concrete floors are to be used, it is advisable to have all filling done as soon as possible so that it may settle down before the floors are laid down. It is most important that the filling be firm and solid and well soaked with water, otherwise the floor will not be a success. Floors may consist of a good lime concrete laid down to a thickness of about 3in. After the concrete has been rammed down, it can be finished off with a cement compo finish. The better plan, however, is to lay the floor with a good cement concrete, and when still soft work on a smooth surface by dusting with dry cement well trowelled into the concrete. This forms the floor into one solid block, and the danger of the top surface leaving the bottom is thus avoided. This trouble sometimes arises when lime concrete is used with a cement finish."

LYNDOCH, January 17th.—Mr. J. B. Harris (Orchard Instructor and Inspector for Lower North Districts) attended the meeting and delivered an address, "Orchard and Vineyard Fertilizers." Mr. A. Springbett tabled a sheaf of Sudan grass. The crop was sown on October 23rd, 1923, and when cut on January 16th was 7ft. high.

A further meeting was held on February 21st, when an address, "The Business of Farming," was given by the Manager of the Turretfield Demonstration Farm (Mr. F. E. Waddy).

ROSEDALE, February 20th.—This being the first meeting for the year 1924, the Hon. Sec. (Mr. F. H. Wolf) presented the annual report and balance-sheet, and the officers were elected for the ensuing term.

SADDLEWORTH, March 22nd.—An interesting discussion arose from the reading of an article in the *Journal of Agriculture*, "Subterranean Clover."

The question, "Noxious Weeds," was also introduced for the consideration of members.

WILLIAMSTOWN, March 14th.—Mr. A. Springbett contributed a paper, "The Pruning and Cultivation of the Vine," and an interesting discussion followed.

WILLIAMSTOWN WOMEN'S, March 5th.—The Hon. Secretary (Mrs. G. Hammat) read a paper, "Butter Making," that had been contributed by Mrs. Garrett, of the Saddleworth Women's Branch. Mrs. Filsell tabled a sample of vinegar that had been made from Doradilla grapes.

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YORKE PENINSULA DISTRICT

(TO BUTE.)

MOONTA (Average annual rainfall, 15.22in.).

February 23rd.—Present: 12 members.

THE COMBINED DRILL AND CULTIVATOR.—Mr. N. McCauley read a paper dealing with this subject, in the course of which he detailed his experiences with this implement. He considered it a great labor saver and the best implement for seeding when soil and weather conditions were favorable. In the discussion that followed, Mr. W. Edge favored the combined drill and cultivator because the wheat made an early start and was able to grow ahead of the weeds. Mr. D. Kitto preferred the combine, but found that the land should be kept very clean because the rubbish was a great trouble so far as the combine was concerned. Mr. R. C. Kitto thought the combine was a good implement for killing weeds. Mr. A. B. Ferguson stated that the combine was a labor-saving machine. The crops came up more regularly, it was not necessary to use harrows behind the implement, and the crop was more evenly sown.

WESTERN DISTRICT.

GREEN PATCH (Average annual rainfall, 26.56in.).

February 18th.—Present: seven members and two visitors.

HOREHOUND AS A NOXIOUS WEED.—In the course of a short paper dealing with this subject, Mr. E. M. Sage said in 1910 there were two patches of horehound on limestone sheoak land, some on the arable land, and some on an adjoining piece of stony land on his property. When clearing up the dead timber for ploughing he grubbed all the plants, and burnt them with the timber. The land was cropped in 1910 and 1911, and left out until 1915, when the weed had again become fairly well established. He again grubbed out the plants and burnt them, but a good crop of seedlings again made an appearance. When the land was cropped in 1919 the plants were not so strong as before, so he relied upon the plough to destroy them; but even where the plough turned them upside down they grew again. Seeing that the plants were spreading again during last year, he again grubbed out the weeds and destroyed them, but at the present time the seedlings were thicker and covered a larger area than ever, so that whilst horehound might be kept under control on land that was cropped fairly often, he considered that on grazing land it would possibly become a noxious weed, especially in districts with a good rainfall. The meeting being held at Mr. Sage's homestead, an opportunity was taken of inspecting the orchard and fodder plots. Afternoon tea was provided by Mrs. Sage.

LAKE WANGARY.

February 24th.—Present: six members and visitors.

COWS ON THE FARM.—In the course of a paper dealing with this subject, Mr. Hull said the farmer should endeavor to obtain the best animals with the means at his disposal, and they would then show a profit for the time spent on them. The number of cows kept on the farm depended wholly on the labor available for milking and attending to the cattle, and where there were large families, good cows were a profitable sideline. When a heifer was to be broken in she should be handled very carefully, and at all times treated with kindness. He did not consider the bail of much practical value, because it was a trouble to keep clean and dry in wet weather, especially where a number of cows were kept. The speaker deprecated the use of the leg-rop because it often made a cow kick that would not otherwise do so. Instead of using the bail, Mr. Hull suggested that the cow should be quietly caught and about 6ft. of chain fastened to her horns, and for a few times she could be tied to a post in the yard. An attempt should be made to avoid tying the animal in the same place twice in succession. Afterwards, one foot of the person milking the cow could be placed on the chain, and very soon the cow would stand anywhere and the chain could then be taken off. If a



Exhibit Staged at the Tamunda Show by the Lone Pine Branch of the Agricultural Bureau.

cow was inclined to kick, a piece of rope or cord could be passed over the back and around the body in front of the udder, and a knot tied on the top of her back. Sore teats could be treated with vaseline or lard. For cowpox, he suggested bathing the teats in a solution of Condy's crystals and water before milking, and afterwards applying a dressing of lard or vaseline. The affected cows should always be milked last. Should a cow be hard to milk, bathing the udder and teats in very hot water before milking would sometimes make a difference. If maximum yields were expected from the cows they should be well fed throughout the year. If cattle were bred on the farm he strongly advised keeping to one breed. Should the farmer be in any doubt as to a cow's health, and a veterinary surgeon could not make an inspection, it was better to fatten her for the butcher, rather than keep on milking her, because many diseases were carried in milk and cream. Four of the main evils that should be avoided in the cowyard were the bad-tempered milkmaid, the bail, the leg-rope, and the bad cow

POOCHERA.

February 2nd.—Present: 17 members and 16 visitors.

FALLOWING.—Mr. W. A. Gosling, who read a paper dealing with this subject, said the first work in connection with fallowing was that of burning the grass or stubble. After that had been done the land should be ploughed to a depth of about 4in. early in June, and after rain had fallen the cultivator should be worked at a depth of from 1½in. to 2in. to destroy any weeds that had been missed by the plough. During March the harrows should be run over the land that was to be fallowed to ensure a good germination of weed seeds. Immediately the cultivator had finished working the fallow the harrows should be brought into use to make a fine surface soil. The land should be worked with the harrows at least once more before harvest, and if a good rain fell the cultivator should be used. Subsequent working of the land would depend on the growth of weeds and the amount of rain received. If the land were cultivated during February or March, the fallow would then be in excellent condition for seeding operations, which work, he thought, was best done with a combine after the first winter rains. For working the land he favored a spring tyne cultivator in preference to the bridle or draught implement, because the former made a thorough job of pulverising the soil. He then quoted the method of preparing the seed bed as recommended by the Superintendent of Experimental Work (Mr. W. J. Spafford) in the Departmental bulletin, "Tillage of the Soil." Mr. Gosling then referred to the difficulty farmers had in that district of dealing with the plant locally known as "buck bush." As a rule that plant made its appearance on the land during December, a time when most of the farmers were engaged at harvesting and could not get out to work on the fallows. If time could be spared, the buck bush could be fairly easily dealt with at that time, but if left until later on in the season it entailed a good deal of work to clear the land of the bushes. In the discussion that followed, Mr. M. Prowett thought cultivating should not be commenced until September. The general opinion of members was that cultivation was governed by the amount of rain and the growth of weeds. Mr. V. Newbon thought ploughing to a depth of 2½in. would give best results in the Poochera district. Mr. S. Joy thought that where the farmer had to deal with light sandy soils it was advisable to plough in the stubble or grass rather than burn it off, so that the straw, &c., might assist in preventing the land from drifting.

WIRRULLA.

October 30th.—Present: 20 members.

The report of the delegates to the Annual Congress (Messrs. H. and F. A. Doley) was received and discussed.

On October 29th and 30th the Manager of the Minnipa Experimental Farm (Mr. Rowland Hill) visited the district for the purpose of judging the crops entered in the wheat-growing competition conducted under the auspices of the local Branch of the Agricultural Bureau. Thirteen crops entered the competition, the result being:—First, Mr. F. A. Doley, Late Gluyas, 85 points; second,

Mr. J. M. Souter, Late Gluyas, 79 points; third, Mr. F. A. Doley, Queen Fan and Caliph, 78 points. On the evening of the 30th Mr. Hill delivered an address to a large audience, including a number of lady visitors.

UNDERGROUND TANKS.—Mr. F. A. Doley, who has resided on the West Coast for nearly 16 years, after having spent several years in the Adelaide hills, in the course of a paper headed "My Experiences with Underground Tanks and Method now Adopted in Construction, and Reason for Same," which he read at the November meeting, said during the winter of 1918 he obtained advice on the construction of the sloping side concrete tank, and the information that he gained had since stood him in good stead. At that time he saw a "slap-up" tank under construction; the tank was about 15,000galls. capacity, it was scooped out, and had trimmed-off sides with a batter of about 2ft. in two, and was taken down to a depth of nearly 6ft. The lower layer of soil was of a sandy nature, with very little rubble in it, which was simply wetted, mixed, put on the side with a shovel, patted down, and then cemented over and tarred. At the present time the tank was full, and the only time it had been repaired was when the roof fell in and knocked a hole in it. He was fully convinced that with a little better mixture for the concrete such a tank would be most serviceable for the Wirrulla district. Other farmers who had seen the same proof and heard the same advice still pinned their faith to the mason-work tank, and in almost every instance that class of tank had given trouble. In 1910 he started farming in the Hundred of Petina, and on the block that he took up a 20,000galls. mason-work tank had been built. The first thunder shower that came filled it, and it emptied nearly as quickly, and although it had been repaired, no more rain had fallen to run water. To put in the seed for the seeding of 1910 was the hardest and roughest experience it had been his lot to face on the West Coast, for every drop of water that was available had to be carted a distance of about eight miles. During the latter part of the winter he had his first experience of working at one of those tanks, one of about 15,000galls. capacity. The following year, 1911, another tank of 17,000galls. capacity was built on the same property. The next year, 1912, another selection in the Hundred of Guthrie was taken up, and a tank of 40,000galls. capacity and nearly 7ft. deep was prepared. All the tanks were constructed on about the same lines. They were scooped out, with a good batter. Lime was burnt and each tank was constructed with the rubble that was scooped out, about seven or eight parts of rubble to one of slacked lime being mixed and used. That was put on from 4in. to 6in. thick, and then two coats of cement were applied, one of about four to one and the last coat two to one. That was turned over, and in every instance the tanks had held and had given no trouble. The following year in the Hundred of Petina he set out to put down a 10,000gallls. or 12,000galls. tank. On that occasion very heavy sinking was encountered, and owing to the lack of explosives, and the fact that harvest-time was approaching, a halt had to be called, and a tank of 7,000galls. or 8,000galls. was made. The tank was constructed in the same manner as the others, and with the same pleasing results. The following year, 1914, no tank was put down, but surplus horses were run on the place and so water had to be obtained from the railways until rain fell. After serving abroad with the A.I.F., he came back to the West Coast fully convinced that even without the Tod River scheme the water difficulty could be overcome. In February and March of 1920, on section 7, Hundred of Wallpuppie, he constructed a 20,000galls. tank of lime and concrete, with two coats of cement, and tar being unprocurable, the tank was washed with cement after the first coat of cement was applied, and the same results were obtained. The tank never leaked, and it had been full several times. In the same year he put another tank down on his selection. The tank was of 20,000galls. capacity, and was finished off with cement wash. During July, 1920, another 12,000galls. tank was completed, being finished off with two coats of cement and a cement wash; no tar was used. Each tank was done with lime concrete, about the same strength as before. Cement wash was used instead of tar, and each one had been overflowing on several occasions, and not any of the tanks had shown any sign of leaking. The following year, 1922, he put down two more tanks, including one of 13,000galls. These were built with cement concrete, two coats of cement, and cement washed. The 13,000galls. tank was finished and had been overflowing

and was watertight. During the winter of 1923 he finished off a 10,000galls. tank and had put down two more, one of 15,000galls. and the other just under 20,000galls. The mixture used was 20 parts of rubble, just as it came out of the ground, and one of cement. The mixture set and made a good solid background, and he felt sure was superior in strength to the lime mixture previously used. For the 12,000galls. tank a little over six small bags of cement were used. One fair-sized limekiln provided sufficient lime to do the two 20,000galls. tanks. Fifteen bags of cement were used on the first tank of about 13,000galls. capacity; valued at 11s. per bag, that would mean a cost of under £8. For the tank completed during the past year, one of over 15,000galls. capacity, he used about 1 ton of cement, which cost about £9 10s. delivered. The tank, which held just under 20,000galls., required 23 small bags of cement, which cost approximately £12, so that the cost of material in all cases would be about the same, 13s. to 14s. per thousand gallons. The figures quoted were exclusive of labor. For practically all of the tanks the sinking had been similar, and a layer of rubble had been encountered which provided the mixing material. On no occasion had he been able to get down to the full depth without striking soil or rock that was too tough to excavate, so that in all cases the tanks were scooped out with a slope of 1ft. in every 2ft. or thereabouts, and enough rubble left in the bottom on which to build the tank. The mixture was prepared at the tank, put on with a shovel, and cemented over, generally with the two coats of cement of five to one for the first coat and five to two for the second coat; finally a cement wash was applied. It was his ambition to provide for horses and a few cattle a storage capacity of about 100,000galls. or a little over. Concluding, Mr. Doley said:—"In summing up, after an experience in this part of the State for 15 years, I am fully convinced that the matter of water storage can be overcome, and if everyone buckled to and put down tanks there would not be the sickening sight of last year, when nearly all hands were busy getting water by the train. One man in the district who only settled in 1916 never rested contented until he had a storage of 100,000galls. on his farm, and last year, when everybody else was rushing the train, he was able to oblige some of his neighbors with water and then had several thousand gallons on hand when rain came. To overcome the water difficulty, it is essential that we all put down more tanks, and from my experience I strongly advocate the building of the sloping-side tank. Anybody who is not frightened of a little hard work, and uses a little care, I am sure will have satisfactory results. The main point in the construction is, never make up the background for concreting; if a big stone is removed or a hole should happen to be made, do not level it off with the earth, but leave the hole and fill it in with the concrete; build up a 6in. or 9in. coping around the top and pack it well with soil so that water cannot get in behind, then, when it is cemented, cover it with brush or iron as soon as possible, and there is no doubt you will be amply repaid for your trouble."

WOOKATA.

February 16th.—Present: 10 members and six visitors.

HARVEST REPORTS.—Reports on the 1923-1924 harvest were given by Messrs. H. V. Hobbs and F. Underwood. Mr. Hobbs reported that land that had been ploughed to a depth of 4in. in July, sown with Currawa wheat at the rate of 1bush. to the acre and ½cwt. of high-grade super, yielded 7bush. to the acre. Land that had been fallowed and harrowed several times before drilling, and sown with 1bush. of Sultan wheat and ½cwt. of high-grade super, and harrowed twice after the drill, yielded between 17bush. and 18bush. to the acre. Mr. Underwood reported that fallow land sown with 1bush. to the acre of Smart's Early wheat and ½cwt. of high-grade super yielded 21bush. to the acre. In the discussion that followed, members were of the opinion that land should be fallowed early in order to obtain the best results. Members thought it would be advisable to harrow new land, providing the land was wet; others thought new land should be harrowed before the drill. Mr. Underwood mentioned that he had sown an area of new land and applied super at the rate of one bag to the acre, and the crop which resulted was almost a total failure. The subject, "Smut in Wheat," was brought up for discussion, when members said they had noticed a great reduction in smut by pickling with bluestone.

COLLIE, March 8th.—Mr. A. P. Rowen read a paper "Rinderpest," which was responsible for a keen discussion. Mr. Rowen also gave information regarding the destruction of rabbits with fumes from a petrol engine.

TALIA, February 16th.—Mr. C. T. Dolphin read a paper, "Comparison of Costs of Hand and Machine Shearing," and a keen discussion followed. A paper on the same subject was also read from the *Journal of Agriculture*.

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EASTERN DISTRICT.

BARMERA.

January 21st.—Present: 15 members.

Papers dealing with the subject "Sanitation and Prevention of Sickness" were read by Dr. R. A. Baker and Mr. T. R. Wilkinson.

On February 13th, 22 members in company with a number of lady friends visited the Berri Orchard, and under the guidance of the Manager (Mr. C. G. Savage) inspected the various horticultural experiments being carried out at the orchard.

Mr. F. H. Levein, of the Berri Branch, attended the meeting and read a paper, "Fruit Drying."

MURRAY BRIDGE, February 19th.—Mr. C. H. Beaumont (Orchard Instructor and Inspector) attended the meeting and delivered an address in which he related some of his experiences during a recent trip to California.

MYRLA, March 15th.—A paper dealing with the subject "Care and Management of Horses" was read by the Hon. Secretary (Mr. C. A. Ziersch). The paper was fully discussed by all members present. It was decided that the annual meeting of the Branch should be held during May.

WYNARKA, February 16th.—The February meeting was devoted to a discussion that arose from reports of the 1923-24 harvest. The highest yield, 18bush. to the acre, was obtained from wheat sown on fallow land. The returns from the hay crops were satisfactory, and several members commented on the benefits that were being obtained by including oats in the crop rotation of the farm.

YOUNGHUSBAND, February 21st.—The meeting took the form of a "Free Parliament." A number of questions of local interest were brought before the meeting, and a keen discussion ensued.

YOUNGHUSBAND, March 20th.—Mr. G. H. Mann read the paper "Tillage of the Soil" that had been contributed at the Annual Congress by the Superintendent of Experimental Work (Mr. W. J. Spafford), and a keen discussion followed.

SOUTH AND HILLS DISTRICT.

BALHANNAH.

February 22nd.—Present: 27 members.

APPLE GROWING.—The following paper was read by Mr. A. R. Peacock:—"It has been proved that the apple tree will grow profitably on a greater variety of soils than any of the other deciduous fruits, for any ground that overlies a strong clay subsoil will produce good crops of apples. The selection of a suitable site for an orchard need not worry the apple grower of to-day, for, although the best position is facing the rising sun, one can produce good fruit where the ground falls in various other directions. There is, however, a slight disadvantage associated with a southerly slope, on account of the cold winds that sometimes blow from that direction when the fruit is setting, and then again, an orchard with a northerly aspect is liable to encounter dry hot winds when the trees are flowering or when the fruit is setting. Great care should be taken in preparing the ground for planting. All timber, stumps, and roots should be cleared off to a depth of not less than 18in. Then the whole of the ground should be subsoil-ploughed to a depth of not less than 12in., in order to provide ample spreading room for the young tree. On no account should the trees be planted less than 20ft. apart, and then on good, average country the branches of the trees will in time touch one another. Always have the ground pegged out before planting. At 20ft. apart, about 100 trees to the acre can be planted. When planting the tree, a hole a little larger than the spread of the roots should be dug, and a small mound of earth formed in the bottom of the

hole. The tree should then be placed on top of the mound, the roots being spread out carefully with a tendency to strike downwards. Any broken roots should be cut off behind the break. After the tree has been placed in position, some fine, loose soil may be filled in and tramped firmly around the tree, after which the rest of the soil should be filled in, care being taken to have the soil around the tree higher than the corresponding earth in order to allow for it setting down, and to carry water away. When the operation is finished, the tree should stand at the same depth as when in the nursery bed. During the first year the ground should be constantly stirred with a scarifier to conserve moisture through the dry summer months and kill weeds. Land treated in this manner assists in giving the tree a good 'kick off' the first year. If this treatment is continued in subsequent years, the trees will make vigorous growth, and soon become large and sturdy. Unless the trees produce strong growth when young, they are apt to become stunted and never make satisfactory orchard trees. It has been proved beyond doubt that the tree grafted on the Northern Spy stock produces the best tree, and that it also is a better bearing tree than those on the Winter Majestin or seedling stock. Both the Northern Spy and the Winter Majestin are immune from Woolly Aphis, but the former throws out very fibrous roots, and is a vigorous grower, whereas the latter has the habit of making long naked roots without fibres. The stock should be worked at least 6in. from the ground, if worked near the surface the scion is apt to throw out roots which will be attacked by Woolly Aphis. Underground draining is always advisable in low-lying land. It removes surplus water in the winter, and helps to sweeten the soil; also the trees are better enabled to resist the attacks of Black Spot. The distance between the drains depends a great deal on the nature and contour of the ground. On ground that has very little fall, it is advisable to put a drain in between each row of trees and the next, no heed being taken of the class of soil on which the trees are planted. On land where a white sandy soil overlies a stiff clay subsoil, it is well to place the drains 20ft. apart, whilst on soils that are fairly open, 40ft. is sufficient. If the drains are placed 40ft. apart, and they do not thoroughly drain the soil, another drain could be placed in between, making them 20ft. apart. All drains should be not less than 2ft. 6in. deep, with the main drains 3ft. deep. On ground that is very wet, 6in. could be added to the above measurements, for the deeper the drains the greater the quantity of water that will be drained from the soil. For ordinary lateral drains, 3in. drainage tiles are large enough, whilst for the main drains, 4in. tiles will suffice. Wooden drains are of little use in the orchard owing to their liability to promote the growth of *Armillaria* in the trees. Stone drains seem to choke more easily than tile drains. It is also a good plan to run a plough furrow through any small dip or hollow, and also across the hillside in a diagonal manner where the land is likely to wash. Pruning is practised in order to increase the vigor of the trees. The operator must have a knowledge of the particular variety with which he is dealing. In pruning the Jonathan the first year, three or four branches should be left well spaced from the stem, so that they will form a well-balanced head, these shoots being cut back to within 6in. of the junction with the main stem. The following year these trees will have made fairly good growth. The main shoots or leaders should then be cut back to 12in. or 14in. while the side shoots which have shot out should not be pruned, because these go towards the future fruit-bearing wood. On no account should the ends be cut off, for in that case they would only grow further without producing fruit buds. The following year it will be noticed that the lateral branches that have been left unpruned will have developed a full length of fruit buds. These laterals may now be slightly shortened back, care being taken to cut to a wood bud, and not to a fruit bud. The main branches will have made further growth in regard to lateral branches, and these should be dealt with as in the previous year. Because these form fruit buds, they will require to be shortened back each year, so that in a few years proper fruit spurs will have been formed. When the trees are about five or six years old, the grower can allow another leader to develop from the already existent leaders, and thus form a double ring of leaders as the tree increases in size. A tree that has been pruned in this manner will, in a few years, be well furnished with fruit spurs from the fork of the tree along the main branch, and

also along the laterals. This style of pruning can also be carried out on such varieties as Statesman, Stayman Winesap, Esopus Spitzenberg, and in a lesser degree with the Buncombe and Reinette du Canada, with the exception that the lateral growth should be kept shortened back, because these varieties bear heavily on short spurs, while the leaders of the last named two varieties can stand a harder pruning than the earlier-mentioned sorts. This latter system of pruning, however, can be carried out on most of the sorts grown, particularly the London Pippin, Rokewood, Stone Pippin, and King David. With the Rome Beauty variety, however, a different style is necessary, owing to its habit of producing long, willowy limbs, devoid of fruit buds. From the time this sort is planted, the laterals should be kept cut back, while the leaders should be kept back to not less than 12in. and not over 8in. of fresh growth each year. In this manner it will be found that by the time it comes into bearing, the tree will be well spurred all along the main branches. The Rome Beauty will carry more fruit per tree, for its size, than any other commercial sort grown. On this variety, one should aim at producing a tree with a double ring of leaders, one inner and one outer row. Thus, when the tree starts to crop, the outside leaders will open out and allow the inside fruit plenty of sunlight. Care should be taken to keep the outside fruit spurs shorter than those on the inside of the leaders for there are always some of the buds knocked off when the orchard is being cultivated. This applies to any sort of apple. When the trees have reached bearing age, the grower must exercise great care in pruning. On poor land it is necessary to prune more heavily than on a richer class of soil, and it must be remembered that heavy pruning encourages two of the worst troubles that the apple grower knows, Bitter Pit and Woolly Aphis. On a heavily pruned tree, the sap has less fruit wood to feed, and consequently less fruit, with the result that the fruit is filled with an excess of moisture and grows to an abnormal size, and is of poor quality and affected by Bitter Pit. In regard to Woolly Aphis, the excess of sap that is forced through the tree results in a rank growth of both foliage and wood, the latter of which is easily attacked by the Aphides. It often occurs that after a succession of heavy crops the orchard needs manuring. Of the several which can be recommended, stable manure is by far the best on poorer soils. It is rich in organic matter, and one good coat of this will keep the trees going for years. Where this manure cannot be obtained, potash, mixed with bone super, is the next best, but it should be applied at the rate of 2cwts. to the acre, spread over a period of three years, to enable best results to be obtained. Where the land is lacking in nitrogen, a cover crop of green peas can be ploughed in, and thus enrich the land, but this is hardly necessary in our district owing to the growth of weeds that is ploughed in every year. Lime is also useful, because it helps to sweeten the soil and eradicate sorrel. It should be applied at the rate of 10cwts. to the acre per year for three successive years. At all times the land should be cultivated, for only by this means can the necessary moisture be conserved. It is best to plough at the end of the winter, and so bury all weeds and help to check the early spring growth. Never plough too shallow, because the roots of the tree come to the surface to draw the moisture and a shallow depth of loose soil soon drys up with the summer weather. Care should always be taken to plough to an even depth right through the orchard, and for this purpose I recommend a ploughing of not less than 6in. When ploughing is finished, go over the ground both ways with the harrows. For subsequent cultivations, the spring-tooth cultivator is best to break up the crusty surface, care being taken to scarify the garden in two opposite directions. One of the difficulties which confronts the modern orchardist is the fertilisation necessary for different kinds of commercial apples. The Jonathan requires most care owing to the preponderance of female blossoms in every cluster. One has to take into consideration the climatic conditions. For instance, in a warmer climate the Reinette du Canada will flower earlier than it will in our district. This fact is borne out also on other earlier varieties here when we have a dry winter followed by an early spring. I believe it is best to have each sort placed alongside some other variety that flowers at the same time. As to the Jonathan, for our own district, I cannot recommend a better variety for cross fertilisation than the Rokewood, with Statesman a close second, for where Jonathan trees are alongside the Rokewood an apple of better color is obtained,

and it also has a harder texture, thus helping in its keeping qualities. There are many other varieties which will effectively cross-pollinate the Jonathan; for instance, the two already named, with the Emperor Alexander, Maiden's Blush, Prince Alfred, Sasma and Esopus Spitzenburg. Dunn's Seedling and Cleopatra can also be recommended where they can be grown successfully. With the Jonathan variety it is best to have two rows of the pollinating variety in every four rows of Jonathans. Any of the other earlier flowering sorts yield better crops where they are inter-planted, and such varieties as Stayman Winesap, Reinnette du Canada, King David, and William's Favourite can be successfully grown together, whilst the later flowering varieties will produce fairly heavy crops where they are grown in blocks. They will also bear a larger quantity in proportion, when they are interplanted, this being particularly so with the Buncombe variety, which should be placed in between the Rome Beauty and London Pippin varieties to ensure it setting a full crop Of the mid-early and later varieties, four rows of each variety are sufficient to ensure cross pollinating. It is advisable always to have a green apple planted in between two colored

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varieties, because it gives the greener apple a reddish tinge. On spraying depends the quality of the fruit grown. When spraying is necessary all other jobs should be placed on one side, for a day's delay in the earlier stages of the fruit is often reflected in the ultimate returns from the trees. One should have the spray pump in use immediately the fruit buds begin to open. For Black Spot and Fusicladium one should commence to spray when theh flower clusters are just starting to open—with the centre bud pink—at a strength of 1gall. lime sulphur solution to every 33galls. of water. When one has apples that are inclined to scab badly, such as the Rome Beauty, London Pippin, and Bismarck variety, it is better to spray when the buds are in the green stage, at the strength of 1gall. of lime sulphur to every 25galls. of water. Care should always be taken to wet thoroughly the whole of the fruit clusters, including the stems. Some growers use Bordeaux or Burgundy mixtures for combating Fusicladium. When the petals of the flower have fallen and the calyx of the newly-formed apple is just starting to close, the first spray to check codlin moth should be applied. This is by far the most important spray of those applied to keep the Codlin Moth under control. If it is delayed for only a short period, it gives the codlin moth an opportunity to deposit its eggs in the calyx of the apple. It is advisable to add to every 100galls. of mixture 1lb. of casein to act as a spreader to increase the covering capacity. With the aid of casein, the mixture forms a film-like covering over the surface of the apple. Flour makes a good spreader, but it should be mixed into a thin paste before being poured into the vat. The first arsenate of lead or calyx spray should be composed of 6lbs. of lead to every 100galls. of water, and to this solution from 1gall. to 2galls. of lime sulphur should be added to help keep the fruit free from Fusicladium. This spray should be applied at high pressure and driven well into the calyx of the apple, and thus kill the grubs when they start to chew the fruit. Great care should always be taken to spray up and down the tree; spraying up on the outside of the limbs and down on the inside, in order to ensure a thorough coating of all fruit. For this spray it is best to use the nozzle, while for all previous and all subsequent sprays one can use either the spray pistol or the spray gun, the latter applying only where power plants are used. The second spray to control the Codlin Moth should be applied not later than 21 days after the first application. It is made up of 6lbs. of arsenate of lead to every 100galls. of water. Great care should be exercised to see that the whole surface of the apple is covered, and so kill any stray Codlin grubs that might be about. The third lead spray should be applied not later than 28 days from the date of finishing the previous spray. It should be composed of 6lbs. arsenate of lead with 1lb. of casein. The later maturing varieties should be sprayed about the middle to the end of February to destroy any later hatched grubs. A pest that has given considerable trouble to fruitgrowers of late years is the Woolly Aphis, which, as I have said before, is due mainly to heavy and injudicious pruning. There is, however, ample means of keeping it in control with the spray cart. It has been said that trees which are well opened out to allow the rays of the sun to penetrate right into the centre have very little Aphis, but while this may apply in a warmer climate, I can see very little in its favor, so far as we are concerned. Where trees are badly infested with the insect it certainly pays to let them go unpruned for one season, provided, of course, that they are making rapid growth. Where one has Woolly Aphis very badly, it is advisable to give the trees a spraying of prepared crude oil emulsion at the strength of 4galls. of emulsion to every 100galls. of water about the end of July. This spray will also help to kill any scale pests that might be harboring about the trunks of the trees. These oil sprays, can, however, only be applied when the trees are dormant, and, as the worst visitations of the pest appear during the spring and summer, it is best to add to either the second or third arsenate of lead spray, ½ pint of Black Leaf 40. This preparation kills the Aphides by contact, and is by far the most effective of all the sprays for combating the pest. Where one uses the Black Leaf 40, unaided by any other preparation, it is best to add a spreader to it, and so increase its adhesive powers. After the infested trees have been properly sprayed with this preparation for one season, they will be kept in check from Aphis for many years to come. By far the worst of all pests and diseases which the apple grower has

had to combat in recent years are Thrips. The Thrip must not be confounded with the Bryobia Mite and the Red Spider. A spray that controls the Red Spider and Bryobia Mite will partly control the Thrip, and the addition of 1pint of Black Leaf 40 to both the green and pink stage sprayings in the earlier part of the season is suggested. Rome Beauty, London Pippin, and Buncombe varieties are often badly attacked by this insect, and as these sorts are subject to Fusicladium it is wise to make the double application to ensure clean fruit, and at the same time help check the Thrip. The bee is probably one of the best friends that the fruitgrower has for pollenising his crop, and it is worthy of note that during the recent two poor apple seasons there were few bees about this district. It is by all means advisable to have the bees in boxes that can be closed up on the days that one is spraying with the different fungicide sprays. Thinning a heavy crop of fruit when necessary is a payable undertaking. If all the fruit that has set is allowed to remain, the crop will be small in size and of little commercial value, whereas if the fruit is thinned; in the case of a heavy crop by at least one-third; the remainder will grow to a much larger size, and be of greater value. Additionally, the trees are likely to carry a more regular crop of good fruit each year, instead of every alternate year. Where the fruit clusters have set heavily it is best to remove all but the centre apple of each cluster, while where the apples are not so thick, two or perhaps three can be left. Even after the thinning has been done, the weight of the remaining apples is so great that unless the main leaders are supported, they will bend over until they touch the ground, and the fruit will be burnt by the rays of the sun striking straight down upon them; whereas had the limbs been propped, the sun would have struck slanting down the limb, and would have colored both the upper and the underneath portions of the apples of the clusters, or in the case of single apples, it would enable the light of the sun to get all around the fruit. Where propping is not done, the limbs either crack or break right off, thereby spoiling the symmetry of the tree which has taken years to build up, besides lessening the carrying capacity of the orchard. It is necessary that we should endeavor to grow only good clean apples for the world's markets.''

CYGNET RIVER.

February 19th.—Present: six members and 16 visitors.

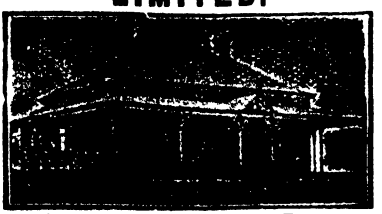
SIDE LINES ON THE FARM.—In the course of a paper dealing with this subject, Mr. H. Cook said on some farms it was necessary to run a side line to make farming a profitable undertaking. Side lines were many and varied, and those that could be adopted differed considerably according to the kind and

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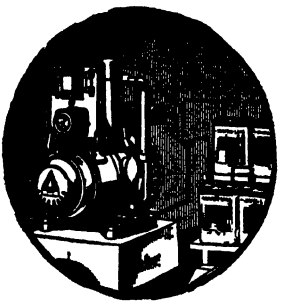
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size of the holding upon which the settler had to work. For the average farmer the best and most profitable side line was, undoubtedly, sheep. For that district he favored the Merino. If the farmer intended breeding sheep, it was most essential that the right class of sheep should be selected. Good ewes were just as important as good rams. If sheep were to be raised for the butcher, it was a debatable point as to which was the best breed, but as a wool producer, or dual purpose sheep, the Merino was to be preferred. Sheep could be used to great advantage for keeping down rubbish on fallow, and often many undesirable weeds and shrubs were completely eradicated through being eaten off by sheep. Sheep also added to the fertility of the soil. He strongly favored hand feeding the animals, especially when the pastures were beginning to get bare. Unless sheep owners were prepared to sacrifice the quality of the flocks, they should not keep crossbreds. If crossbreds were kept, the production of mutton should be the first consideration, and wool a secondary object; with the Merino, however, wool was of first importance. A very noticeable feature of recent years was the marked preference judges had shown for the strong-woolled Merino in most of the leading show rings. That point, he thought, should be carefully studied and not carried to extremes, because it was the fine wools that were commanding the highest prices to-day. Dairying under suitable conditions was also a profitable side line. It was perhaps best where the holding was small and the family large. If labor had to be employed, then the bulk of the profits would be expended in wages. It was essential that good cows be kept. It was not so necessary to have heavy milkers as it was to have cows that would produce a large percentage of butterfat. For the farmer, he considered that the Jersey was the most desirable breed, and the Holstein a good second. Summer fodders were a very important factor towards the successful keeping of cows. Foremost amongst these was lucerne, but the crop required a lot of attention and a good supply of water to ensure abundant fodder. Maize, sorghum, Sudan grass, and chou moullier were also good milk-producing fodders. With dairying, pig raising should be seriously considered, because, as a general rule, those two operations were most successfully combined. Like most stock, it was very important that a good class of pigs should be secured at the very beginning. Pigs could easily be fattened if proper methods were adopted. He recommended feeding pigs about four times a day, whilst they were being fattened for market. Poultry was a line that most farmers could hardly do without, and as a side line it could be made a good source of revenue as well as a considerable saving in the upkeep of the house. A good strain of Black Orpingtons was the best breed of fowls for farms on Kangaroo Island where eggs were required, and for table birds, the Black Orpington crossed with English or Indian Game. In isolated districts a flock of turkeys would be a good asset. There should be no reason why the average farmer should have to buy either eggs, bacon, or butter. On larger and well-grassed areas, perhaps raising beef cattle might be considered, because there was always a demand for the right class of good fat cattle. Breeding horses might be considered in much the same light as that of breeding cattle. The market for horses was often unsatisfactory, but there always seemed to be a demand for a good class of heavy farm or team horse. With the price of barley so low as it had been during the past year or two, it made the farmer consider one or other of such side lines in a very serious manner, and unless the market for barley improved, he thought it would be necessary for barley growers to look to something else as a means of income. Hay growing could be carried on, and if there were no local market for hay or chaff, it could be fed to sheep and thereby show a good margin of profit. Too many side lines did not pay, because they could not be given the proper amount of attention which they required. In concluding the paper, he again emphasised the necessity for procuring only the best class of stock for breeding purposes.

MacGILLIVRAY (Average annual rainfall, 19in. to 20in.).

February 18th.—Present: five members.

Farming and Eucalyptus Oil Distilling.—Mr. A. Nicholls, in the course of a paper under this title, said that owing to the shortage of labor for leaf cutting at the time of the year when oilmaking was most profitable, farming and oilmaking



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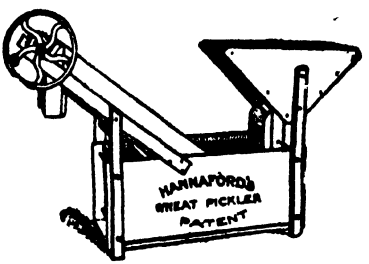
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could not be carried on successfully together. If a landholder on Kangaroo Island were desirous of following agricultural pursuits, no matter whether growing crops or keeping sheep, it was necessary for him to devote all his energy to clearing scrub and working the land. The land had to be fallowed and cultivated after every rain to secure the best results. For eucalyptus oil production an up-to-date still at the present time would cost about £200 to erect, and it was necessary to enter into contracts to dispose of the oil. The oil market was not to be relied on. Sometimes there was a market for oil, but last year oil could not be disposed of at any price. If an unfailing market could be guaranteed at 1s. 6d. per lb. for crude oil, distilleries could make oil during the whole of the year, but at 1s. 3d. per lb. oil distillation was only a payable undertaking for about two months of the year, and those two months were the period when the farmer should be harvesting cereal crops. Oilmaking was a useful standby, in that it provided the grower with ready cash, but there was always the danger of the settler allowing the land, which had costs pounds to clear and sweeten, to grow up to scrub again, and then it was found that there was no sale for oil. He was of the opinion that if there were no eucalyptus leaf or yacca gum on the Island, the Island would show more signs of development. A good deal of the land was poor, but it would all grow feed for stock. The greater portion of the land was sour and required a good deal of working to sweeten it, with not much profit for a few years, but with sheep and cultivation it would grow feed. Much of the ironstone country would grow turnips, rape, mustard, and rye. Land seeded with barley or oats, with 100lbs. of super to the acre, sown for sheep and left out for two years, would provide good grass for grazing. There was no holding in the district that did not contain a piece of land on which the settler could grow hay and a little corn and keep a cow, a few pigs and poultry, and grow his own vegetables, but he could not do that and make oil.

McLAREN FLAT.

December 18th.—Present: 47 members and three visitors.

PHYLLOXERA.—Mr. Wyatt, in the course of a paper dealing with phylloxera, first gave an interesting description of the life history of the insect, and then referred to its appearance in Australia in the following terms:—"In 1877 phylloxera was found in a vineyard at Geelong, Victoria, and all vines growing within a radius of some miles were uprooted. It was found in Bendigo, Victoria, in 1893, and again all vines growing within a certain area were uprooted, and the soil treated with $C.S._2$. In 1899 it broke out in Rutherglen district, Victoria, and again certain vineyards were uprooted and treated with $C.S._2$. In the same year a general inspection of the vineyards of Victoria revealed the fact that phylloxera existed in six different vineyards in Rutherglen, four in Ardmond, one in Mooroopna, and several in Trolamba, Bendigo, Geelong, and Tapbite. All of the wine-growing districts of Victoria except Lilydale and Great Western were found to be infected. Before 1899 the majority of the outbreaks of phylloxera in Victoria were discovered by the individual grower himself, and then only when a certain number of vines were dead or dying. It takes from three to six years, and in some cases more than that, for phylloxera to kill a vine. The yearly treatment of infected vineyards with $C.S._2$ is altogether too costly to be carried out commercially. The same may be said of annual submersion, which can only be carried out successfully in certain localities. Grafting on American resistant stocks is the only means left to the grower of dealing with this insect. When phylloxera broke out in Europe and started destroying the vineyards of France, French scientists argued that, since phylloxera only fed on plants of the genus *Vitis*, it would only be a matter of time before all vineyards and vines would be destroyed, thus unless the parasite changed its food it must die out too. It would be committing race suicide by killing its host plant, and destroying its supply of food. They contended that there must be a *Vitis* somewhere able to withstand the ravages of the insect. On investigation they found that the wild vines of America resisted the attacks of the insect. Natural selection had evidently taken place, and only those vines that could withstand the attacks of the insect were growing and the insect living on them. It was also found that, unlike the European vine (*Vitis vinifera*), the American vines belonged to many distinct botanical species, each with numbers of varieties and endowed with distinct properties, and each growing in a different soil and climate."

AGRICULTURAL PUBLICATIONS.

The following bulletins and leaflets may be obtained by residents of South Australia by sending a 1½d. stamp for postage of each copy required; other places, 3d. each:—

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THE AGRICULTURAL BUREAU.—Particulars of this Organization, of which every farmer should be a member, can be had on application to the Department.

ROCKWOOD.

February 16th.—Present: seven members.

FRUIT DRYING.—In the course of a paper under the title, "Sun Raysed Fruits," Mr. L. Heath first made a reference to the amount of fresh fruit that was wasted, but which, with very little trouble and expense, could be dried and turned into a palatable and nutritious form of diet. The speaker mentioned apples, pears, figs, peaches, plums, &c., as varieties of fruit that could be easily dried, and in treating grapes he suggested that the bunches should be dipped in a weak solution of washing soda, then hung on strings in an iron-roofed shed. In order to keep weevil from attacking the fruit, he suggested the following plan:—"Obtain an old tub and place in it a small quantity of sulphur. On top of the tub place a sieve or a piece of metal gauze, then set alight to the sulphur, so that the fumes will rise through the gauze, and circulate around the fruit. The fruit can then be placed in calico bags and hung up in a dry place."

HOMESTEAD MEETING.—A further meeting was held in Messrs. Green's and Neighbour's gardens on February 26th, when the Orchard Instructor and Inspector for the District (Mr. C. H. Beaumont) was present and delivered an address, "Work in the Orchard and Garden."

BLACKWOOD, February 18th.—Mr. A. L. Warren read a paper, "Apricot Culture," which was followed by an instructive discussion.

CURRENCY CREEK, February 22nd.—An address, "Top-Dressing of Pasture Lands," was given by Mr. S. R. Cockburn, and a keen and interesting discussion followed.

KANGARILLA, February 22nd.—Mr. S. Smith, of Meadows, attended the meeting and delivered an address, "The Foot of the Horse." The lecturer dealt with the shoeing of the foot, and touched upon some of the common troubles of the feet. Shoes of various designs were exhibited by the speaker, and an instructive discussion followed.

PORT ELLIOT, February 23rd.—Mr. F. G. Ayres gave an instructive address, "Dairying." At the conclusion of the meeting it was decided that a Branch of the Dairymen's Association should be formed at Port Elliot.

SOUTH-EAST DISTRICT.

KALANGADOO WOMEN'S (Average annual rainfall, 33in. to 34in.).

February 9th.—Present: 12 members.

VEGETABLES AND HOW TO COOK THEM.—The following paper was read by Mrs. D. W. Tucker:—"The important part that vegetables play in connection with our health cannot be too highly emphasised. Root vegetables are not so highly recommended as green-topped vegetables, because they contain more iron and flesh-forming constituents, especially spinach and cabbage. Green peas are more easily digested than dried peas, although less nourishing; the same applies to fresh and dried fruits, so that they both need more boiling or steaming than the fresh article. Celery is one of the best foods, and it can be used in soups as well as eaten in the raw state with bread and butter. Lettuce is another very useful vegetable on account of its saline properties. Onions are amongst the best vegetables for health purposes, and should be consumed more freely than is often the case. They can be prepared for use in so many ways—as flavoring for dressing geese and ducks and as onion sauce. Most people are very fond of potatoes, yet they are the least nourishing and contain more starch than any other vegetable. They are not good for children unless plenty of milk, butter, or cream is added to them when they are being mashed in order to make them more nourishing. Carrots and parsnips should be steamed in a steamer, because baking in the stove is inclined to toughen them; the skins can be easily removed after cooking by rubbing with a coarse cloth. Old potatoes are more wholesome if prepared in this way, because the nutritive qualities are retained in the skins. New potatoes are not too well spoken of, and should be eaten with care. To

cook them add cold water with a little salt and boil for 10 minutes, pour off nearly all the liquid, and return to the stove again and finish cooking by steaming. This allows the potatoes to remain whole. Remove the skins before serving, otherwise scrape before cooking. If one has to buy root vegetables, they can easily be kept quite fresh for some time by covering them with wet earth or wet bags. Peas and beans can also be kept fresh by putting them into wet bags and keeping them in the shade. Cabbages and cauliflowers will remain quite fresh if a round hole is cut in the stalk and kept filled with water and placed face down in a cool cellar. Lentils can be used plentifully in soups, and half a pound of lentils is equal to a pound of meat or three eggs, and they are not so heating to the blood as meat and split peas. The egg-plant is a very valuable form of vegetable. It can be sliced and fried in butter and put on toast or served with vegetables. All green vegetables should be cut in the early morning, and to get the best results they should be soaked an hour in salt and water to remove grit and insects before being cooked. Boiling water in which salt and a little carbonate of soda has been added should be ready, and into this the cabbage or cauliflower should be dropped and boiled rapidly with the lid off the saucepan. Use only the white stalks of silver beet and leaves of spinach. Add salt to boiling water and boil gently. If the cabbage is old, a teaspoonful of vinegar will assist in making it tender. Old green peas or beans can be treated likewise. A little mint should be boiled with peas. Skinless peas can be prepared in the same way as French beans. Young broad beans are cooked in the same way. Sugar, if used instead of soda when cooking young beans, and served with white sauce, adds to the palatability of these vegetables. All root vegetables should be started in cold water and gently brought to the boil with the lid on, otherwise they will be tough. Carrots and parsnips if boiled should be scraped with a sharp knife. Turnips, kohl rabi, and artichokes should be peeled rather thickly, because there is often a woody fibre just under the skin. Pumpkins and marrows should be peeled, seeded, and cored, then cut into square blocks, and either boiled, baked, or stuffed with bread crumbs and onions, which makes a delicious dish. Beetroot and rhubarb are very beneficial to health. The former should be well scrubbed, care being taken not to cut too near the bulb to cause it to bleed, then well boiled, the skin is removed, the root sliced, and each layer sprinkled with salt. Finally, the beet is covered with vinegar. Rhubarb is highly recommended because it acts as a cathartic."

PENOLA (Average annual rainfall, 26.78in.).

March 1st.—Present: 10 members.

HAND-FEEDING OF SHEEP.—The following paper was contributed by Mr. F. Kidman:—"To obtain the full benefit of sheep in the South-East, hand-feeding is necessary when feed is scarce. From September until late in the summer months every farmer, as a rule, has too much grass or feed, and for the remainder of the year after the first autumn rains until the early spring the feed is very scarce. If the lambing ewes are fed, the remainder of the flock will be allowed more grass. The best method is to start feeding the ewes a few weeks prior to lambing, and after a few days the sheep will become very quiet and come to the feeders at feeding times. Under such conditions, hand-feeding will prove a paying proposition. Last winter, which was an exceptional one, I did not lose any lambs from hand-fed ewes, but in one paddock where the ewes were not hand-fed I lost fully 50 per cent. of the lambs that were dropped during the cold and squally weather. In one case I hand-fed 50 ewes, commencing feeding from April 1st, and continuing for a period of 75 days, allowing 1lb. of barley daily to each sheep. The sheep were running in a small paddock, which allowed them to pick up a little roughage. With barley at 3s. per bushel, it cost 4s. 6d. per sheep for the 75 days. These ewes had 48 lambs. I also had 50 ewes of the same flock running in a paddock on natural grass. This flock was not hand-fed and only dropped 38 lambs. The hand-fed ewes cut 1lb. of wool per head more than the grass-fed ewes, while the lambs that received the grain ration cut ¾lb. of wool per head more than the other lambs. The simplest plan to adopt when commencing to hand-feed is to shut up, say, a dozen sheep in a small yard, and when they are hungry, tip a little grain in the yard and they

will soon commence eating. So soon as they have made a start, put in a small feeder, in order that the sheep will become accustomed to it, then each day a few more sheep can be added. The flock can be turned out into a grass paddock each night, and fed night and morning with a small ration. When the small flock is accustomed to the artificial feeding, then the whole flock can be hand-fed. I have tried several different rations for the sheep; 2lbs. of chaff per day mixed with ½lb. of barley or oats; but in the wet weather the sheep do not care for chaff when it is wet, and in windy weather the chaff blows out of the feeders into the wool. The simplest method is to feed on grain; there is no waste, and a sprinkling of salt with the grain or chaff assists in keeping sheep in good health. A good feeder can be made with bags. Split the bags lengthways, and then run two pieces of wire through the edges; put in pegs about 6ft. apart, running the wire through the bags. Have wooden spreaders about 8in. wide, 3ft. apart, the whole length of the trough. Fifteen bags will make a feeder that will easily accommodate 60 sheep. A farmer who makes up his mind to put in 10 acres of oats or barley each year to harvest the grain for his ewes will find it very profitable. The crop should yield 300bush., which would feed 200 ewes for two and a half months." In the discussion that followed, Mr. Hinze asked whether whole or crushed grain was fed, and whether carting out sheaves of hay and allowing the sheep to eat off the heads and giving the balance to cattle was a good method. Mr. Kidman stated that it was not necessary to crush the grain. If sheaved hay were used, a very large quantity of it would be destroyed. Hay was more expensive than grain. Mr. Miller thought that where top-dressing of pastures was adopted, it would not be necessary to hand-feed. He pointed out, however, that whilst grass, &c., was growing, hand-feeding would be necessary in winter, especially for lambing ewes.

TANTANOOLA.

March 1st.—Present: 12 members and two visitors.

Herd Testing.—Mr. R. Campbell (Hon. Sec.) contributed the following paper dealing with this subject:—"As it is now becoming a general rule for cheese and butter factories to buy milk on butterfat content, it behoves suppliers in their own interests to raise the quality of their product above the mediocre line. This can only be done by a stringent culling of the herd, and saving calves only to fill the blanks, or to increase the number from proved and tested good milkers, and by using bulls of known and guaranteed milking strains. Taking the usually accepted 3.6 per cent. as the standard at 9d. per gall., each point beyond this butterfat content represents ¼d. per gallon extra; thus on this basis milk showing a 4.2 per cent. fat content would be worth 10¼d. per gallon. The present haphazard method of judging the quality of a cow by the quantity only of her milk is a most unreliable one, for many cows of large yielding capacity are poor yielders of butterfat. The writer has before him several sheets of one member of the Glencoe Herd Testing Society, the test ranges from 6.6 per cent. to 3 per cent. on the morning test, and from 6.9 per cent. to 3 per cent. for the evening test. Needless to say the highest two yielders are cows that are drying off, and the other only just in, but both of the best cows are good yielders in the spring months. To have milk tested occasionally is neither a satisfactory nor a reliable practice on which to base calculations for the whole herd. The writer had a case brought under his notice when a cow in a certain herd was tested and gave a 6 per cent. test, yet the factory test for the whole supply was only the normal 3.6 per cent. The only reliable method is to put the whole herd to the test. Not everyone has the time, the knowledge, nor the inclination to do this, so the only alternative is to form a Herd Testing Society, and pay someone who understands the business to do the work. There are several societies operating south of Adelaide. In the society at Murray Bridge, Mr. C. Morris's herd of Holstein cattle took the first prize recently. During the season the herd yielded an average of 363.87lbs. of butterfat from 914.01galls. of milk. Three years hard culling brought this herd up to this high standard of excellence, which is approximately 200galls. per cow more than it was at the beginning, representing £8 6s. 2d. per head for the whole herd. The writer believes that a Herd Testing Society in this district would be a good thing, because, in his opinion, there is much room for improvement in local herds.

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

No. 10. MAY 15, 1924. VOL. XXVII.

Published Monthly by the Department of Agriculture.

Edited by H. J. FINNIS.

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T. BUTTERFIELD,
Minister of Agriculture.

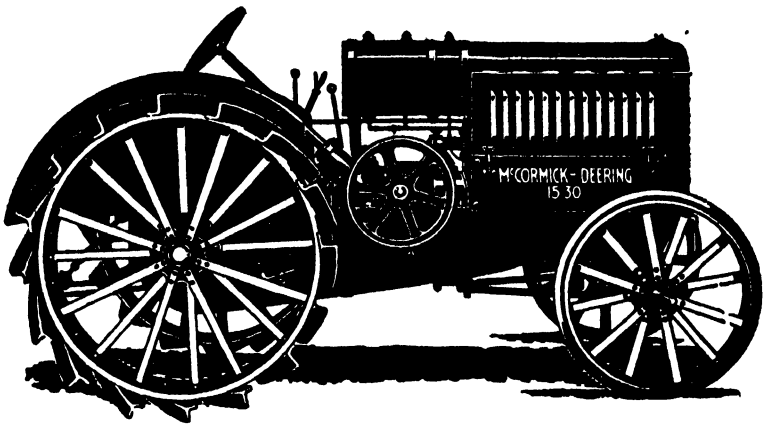
POINTS FOR PRODUCERS.

Dairying and Pig Raising on Eyre Peninsula.

It is anticipated that the establishment of freezing works at Port Lincoln will give an impetus to dairying and pig and lamb raising in the neighborhood, and farmers there have already sought the assistance of the Department of Agriculture with the object of securing guidance, more especially in relation to the type of animals most likely to meet requirements. Accordingly, arrangements have been made for a series of lectures and farm to farm visits by the Assistant Dairy Expert (Mr. H. J. Apps) and the Wool Instructor of the School of Mines (Mr. A. H. Codrington). These officers will visit Eyre Peninsula during June, and will address meetings at Green Patch, Big Swamp, Edillilie, Lake Wangary, and Port Lincoln. Branches of the Agricultural Bureau in the neighborhood are responsible for local arrangements.

The Agricultural Bureau.

The Department of Agriculture has issued a Bulletin written by the Secretary of the Advisory Board of Agriculture (Mr. Harold J. Finnis), dealing with the Agricultural Bureau of South Australia. The bulletin is published primarily for the guidance of hon. secretaries of Branches of the Bureau, but it contains an amount of information of general interest in relation to departmental activities. Dealing with the institution from the historical point of view, it mentions that from a humble beginning with five Branches and a membership of 53 in 1888, the Bureau has grown to the extent of 221 Branches, with a membership of 6,182. Discussing the institution in its relationship to the Department of Agriculture, Mr. Finnis points out that the Agricultural Bureau is part of the Department of Agriculture. It provides the point of contact between the agriculturist on the one hand and the expert officers on the other. It is the principal channel by means of which the Department of Agriculture can distribute knowledge gained in the course of its research and investigational work on the experimental farms, in the field plots, and in the laboratories. It would appear that whilst practically all civilised countries of the world have found no inherent difficulty in establishing and equipping with an adequately trained staff, institutions for agricultural research, an almost general difficulty has been to interest agriculturists in such institutions. Even within the boundary of the Commonwealth itself are to be found illustrations of this at the present time. Fortunately, in South Australia, this difficulty has never been a pressing one, because here an organised body of agriculturists, seeking guidance on technical agricultural matters, existed before the department was established to provide that help. Recognising the undoubted advantage that these circumstances presented, the Department of Agriculture has set itself to cultivate to the fullest this institution which is found ready at hand for its extension and propaganda work. For this work the Agricultural Bureau is particularly fitted. It provides the department with an organised centre in every district



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in which there is a Branch. Thus, when occasion arises, it is possible to establish contact with the agriculturists of a district in a body; an economical and efficient method when compared with the dissipation of time and effort involved in an individual canvass. And because of this fact, it enables a relatively small technical staff to accomplish much more than it could were there no such organisation available. Hence the Department of Agriculture looks upon the Branches of the Agricultural Bureau as its outposts in the rural districts. It seeks the co-operation of the Branches in every way possible, in the arrangement for visits by technical officers, in the planning and conduct of experimental tests, and in the collection of data on local agricultural matters. It encourages the local Bureau to seek its aid on behalf of members desiring advice on all problems affecting their stock and their crops, in health and in disease. It encourages them to visit, as individuals or as bodies, the Experimental Farms and Orchards, demonstration and experimental plots under its control. And, above all, its seeks to cultivate through the medium of the Bureau, that mutual understanding and respect, without which it would be difficult, if not impossible, for the Department of Agriculture to perform the functions which justify its existence.

Fodder Crops in the South-East.

The reduced price being received for malting barley is leading farmers in districts in which this is the principal crop seriously to consider the wisdom of a change in their farming practices, and adopting other crops for their holdings. This is notably so at Millicent, and as this district is well adapted to the production of livestock, much thought is now being given to fodder crops. The value of the peaty land of the Millicent district for this purpose was recently demonstrated to the Superintendent of Experimental Works of the Department of Agriculture (Mr. W. J. Spafford), on the holding of Mr. F. A. Edwards, where very high grazing returns have been secured from a field of rape. In a field of about 80 acres in extent, about 50 acres of which consist of peat, 40 acres of the peaty land was sown with a mixture of rye and rape in the autumn of 1923, and although the block has been grazed continuously since September, quite half of it is still covered with a dense growth of rape about 4ft. in height. In September, 800 sheep and 41 head of cattle were turned on to the field, and after being withdrawn for one week in that month, were returned, and have been grazing it continuously ever since. The depasturing of this number of livestock for a full six months shows a grazing value for the whole 80 acres of the equivalent of about 7 sheep per acre per year, and as the 40 acres of the field not sown to fodders certainly did not carry so much livestock, the rye and rape must have already carried the equivalent of 9 to 10 sheep per acre per year, and much good pasture still remains. The stand of rape was so thick and so high that sheep could not get into it, but were forced to graze around the edges of the crop until the cattle had made tracks through it, and even then the outer edges of the crop have been fed right down, whereas in the centre of the block the plants

of rape are 4ft. and 5ft. in height. Mr. Edwards has also had good results from Italian rye grass, and is now seeding land to subterranean clover in an effort to improve the pasture of the high land surrounding the peat swamps.

Milk Fever in Cows.

To a correspondent, Mr. Allan H. Robin, B.V.Sc., Government Veterinary Officer, has supplied the following information with respect to milk fever in cows, its cause and treatment. "The actual exciting cause of this condition is as yet somewhat obscure, though the conditions under which it appears are well known. It is essentially a disease resulting from domestication of the cow, and it is the heaviest milkers which are more prone to the disease. It appears in cows only at or shortly after calving. It may attack cows in low condition, though it is more common in cows in good condition. Heavy feeding just prior to calving, and lack of sufficient exercise predispose to an attack of it, and the risk of contracting the disease is great if the secretion of milk has been suspended for some time before calving, the cow meanwhile receiving the same amount of good food. Special apparatus is provided on the market, known as "milk fever outfits," for satisfactory treatment of this condition. With this apparatus, and observing strict cleanliness, sterile air is pumped into all four quarters of the udder of the affected cow until they are well distended. Tapes are tied round the teats to prevent leakage, and the inflated udder massaged. The animal must then be propped up with bedding or sacks filled with straw, chaff, or earth, so that she is kept sitting up on her brisket. It is fatal to allow her to lie flat on her side. If this treatment is carried out promptly and thoroughly, the animal generally pulls round within 24 hours. After recovery, give her a good drench of Epsom salts, and keep her on half rations for two or three days. The udder should not be stripped right out for two or three days after an attack, or the animal will probably suffer a relapse, from which it is more difficult to effect satisfactory recovery.

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INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Replies furnished by Mr. A H. ROBIN, B.V.Sc., Stock and Brands Department.]

"P. B.," Lyndoch, has cow due to calve in fortnight. The cow is being dried off. The milk is lumpy, and the teats show signs of becoming blocked.

Reply—Evidently your cow has an attack of mammitis, and such a sequence as you fear might occur. You would be able to lessen the chances of this occurring by occasionally passing a sterile milk catheter up each teat to keep it free from any blockage forming, particularly at the base of the teat. This manipulation must be conducted with the greatest possible care, otherwise you may only aggravate the mammitis. Before operating on the teats in the way suggested, thoroughly wash them so that they are quite clean on the outside, particularly round the teat openings. See that the milk catheter is thoroughly sterilised by boiling before passing it up the teats, and sterilise it again each time immediately after each teat is treated and before going on to the next one. Do not forget to have thoroughly clean hands. Pass the catheter and manipulate it gently in attempting to keep the duct clear of blockage.

"P. F. L.," Mount Barker, reports mare off feed, walks and lies down as if in pain. Has difficulty in passing manure, and at times rests on her haunches like a dog.

Reply—Feed your mare only on light easily digested food. Give her a drench of raw linseed oil 1½ pints, turpentine 2oz. Have some of the following powders made up, each containing nux vomica 1 dram, powdered gentian root 3 drams, and give her one of these night and morning for a week, then leave off for two or three days, and if necessary repeat. Give the powder half an hour before feeding, and the best way would be to mix the powder up with a spoonful of treacle or molasses to make a stiff, sticky paste, and smear it on the back of the mare's tongue and back teeth so that it sticks there, and she has to lick it down. Also give her, night and morning, immediately before feeding, or about an hour after feeding, one teaspoonful of dilute hydrochloric acid in half a pint of cold water.

Hon. Secretary, Waikerie Agricultural Bureau, reports milk from cows turning pinkish or blood stained after being in milk about a fortnight; cows in good condition, and fed on lucerne.

Reply—Milk being pinkish or blood stained when drawn from the udder may arise from injury to the udder or over-rich feeding. In your case, I would suggest that you reduce their ration of green lucerne and substitute some dry feed in its place. The feed ration, as a whole, could be somewhat reduced. There should not be any need for further treatment, save that a good dose of physic (Epsom salts 1lb., molasses ½lb., ginger 2oz., water 1½ pints) to each of the cows would help towards a clearing up of the trouble.

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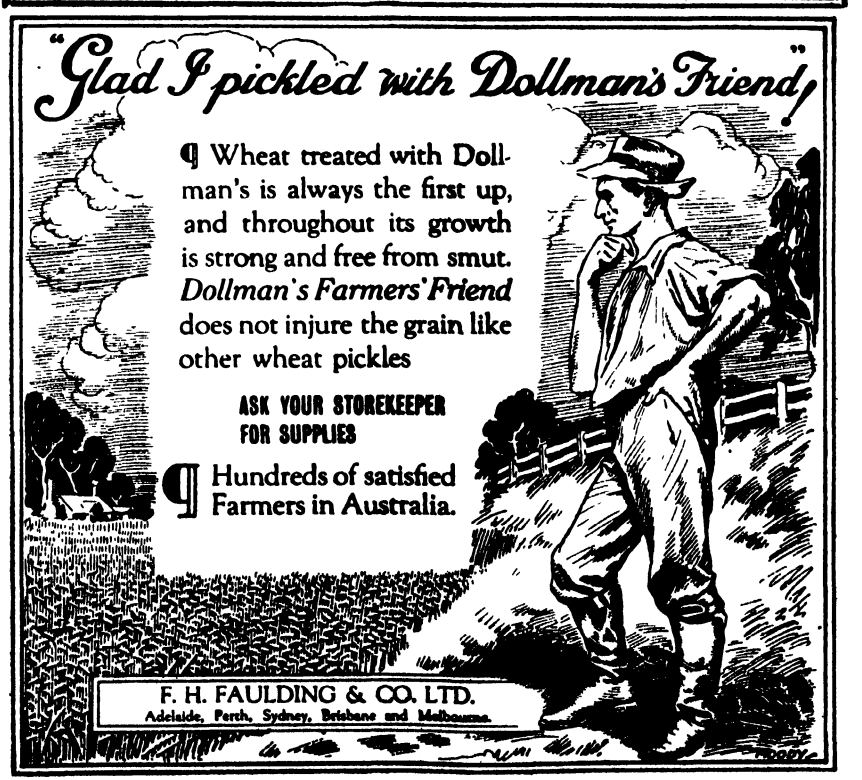
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"J. R. B.," Wynarka, seeks (1) treatment for horse with hard swollen knee, caused by a kick, and (2) the difference between a stallion and an entire.

Reply—(1) *Re* horse with swollen knee. It is improbable that any treatment will be efficacious in reducing the swelling on the knee, but the most suitable to make an attempt with would be to clip the hair short over the area of the swelling, and rub well in for 15 minutes some red mercurial blister, made up in strength of one to eight. Apply in the early morning, and keep the animal tied up short until evening. The following day, wash off with warm water and soap, and smear on some vaseline or bland oil before turning the horse out. The blister may be repeated in four to five weeks' time. (2) *Re* stallion and entire. Both terms signify the same.

Hon. Secretary, Yadnarie Agricultural Bureau, reports several cows with ulcerations between teat and udder; flow of milk not affected. Cows had previously been milked with dry hands, and trouble commenced after milking with wet hands. (2) Man allowed to do heavy pull; next day udder was swollen. Feed has not been changed lately.

Replies—(1) "Dry" hand milking is in every way preferable to "wet" hand milking, being less liable to set up such trouble as your member experienced, as well as being the cleaner method. Wet hands are more liable to collect dirt and grit on them than dry hands, and chafe the teats. Many milkers are, unfortunately, prone to practise the wet method, because they find it easier than the dry, but when it is practised care must always be exercised to carefully wipe dry the teats and lower part of the udder when milking is finished, and before turning the cows out back into the paddocks, where they are fully exposed to the weather. Wet teats exposed to cool winds blowing on them are liable to be chilled, and so become inflamed and sore. (2) The accident could be the result of a strain following upon heavy work. The owner should spell the mare, put her in warm, comfortable quarters, and feed on laxative food with a handful of Epsom salts added twice daily for a few days, and if the udder is very sore. apply hot fomentations, and gentle massage.

"K. M. B.," Echunga, reports Jersey heifer showing loss of appetite and condition, ceased chewing the cud, walks with neck extended with head on one side; when lying down neck and head rest extended on ground; is able to swallow.

Reply—There would appear to be some trouble in the upper portion of the neck, just behind the head, in consequence of which it is painful for your cow to hold her head up in a normal position. Without the benefit of a personal examination one cannot offer any more precise diagnosis or suggest remedy. As the heifer is a valuable one, I think you would do well to obtain the services of a private qualified veterinary surgeon to visit and examine the beast.

Hon. Secretary, Agricultural Bureau, Talia, has horse with warts around the eyes.

Reply—The eyes in horses form a favorote site for warts, which consist in a simple diseased overgrowth (hypertrophy) of the surface layers of the skin. If they become rubbed, raw, and bleed, they will spread often very quickly. It may be that your grazing the animal on stubble is helping to spread them through rubbing. It would be wise, then, to keep him off it. The eye should be bathed with a little lukewarm boracic lotion to clear it up. If the warts are small, and stick up, they may be removed by snipping them at the base with scissors, or tying them round the neck with a piece of stout thread, which is left there till they drop off. In larger warts, the latter is the best procedure, as they are apt to bleed freely when cut. Their destruction can then be completed by daily application of a crystal of copper sulphate (bluestone) until the growth is completely removed. Care must be taken with those in close proximity to the eye that none of the bluestone is allowed to get into the eye. If you have no bluestone available, rubbing a little vinegar on them would help somewhat to cause their disappearance.

"A. N.," Shoal Bay, reports aged mare feeds irregularly, and occasionally discharges yellow matter from the nose. Rolls as if in pain, and bites her ribs.

Reply—The mare has had an attack of indigestion colic, and there was probably a certain degree of impaction of the bowels. It would be advisable to give her a good laxative drench of raw linseed oil 1½ pints, and turpentine 2ozs., to clean

POWER FARMING

The Question of the Hour.

An additional list of questions put to us by farmers is given below, together with our replies.

Question — *Will I get a bigger yield through using a tractor?*

Answer Here is an instance that happened in South Australia last season. It relates to two experienced farmers whose farms adjoined with only an ordinary fence dividing the two paddocks. Farmer "A" was anxious to get a larger number of acres under crop. With that object he started his seeding early because time was short, but unfortunately, through having to depend upon horses, he began operations with the ground too wet. His neighbor, Farmer "B" was also anxious to put in a greater number of acres, but was able to wait until conditions were favorable. He was able to do so with perfect ease, because he owned a CASE tractor. This enabled him to do a greater quantity of work than Farmer "A" could get from his horses. Farmer "B" waited. The result at harvest time was striking. Farmer "A" reaped 7 bags to the acre, while Farmer "B" with his CASE tractor obtained 15 bags. His daily average number, reaped, bagged, and sown, was 289, his best day exceeded 300. Farmer "B" used a 15/27 CASE tractor with an extension steering control and an 8ft. reaper-thresher.

Question — *Will a CASE tractor enable me to put more under crop with the same amount of labor?*

Answer On account of its economical running costs and the long periods it can go without a halt for spells, the CASE tractor, being a one-man outfit, enables the farmer to put a greater area under crop than can be accomplished by horses. The increased crop acreage means a consequent increase in income.

THIS USER

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"I can conscientiously say the CASE 15/27 has given perfect satisfaction at every kind of work on the farm. Its power is equal to two eight-horse teams, inasmuch that I have worked 2,500 acres, including all operations, since I purchased my Tractor.

Last year, pulling 23 furrows, I turned back 440 acres of hard fallow in 13 days at a total cost of £24, or 1s. 1d. per acre (including kerosene, petrol, grease, and oil), but the fuel consumption varies to conditions. With a 12ft. 6in. Combine I worked 50 acres of stubble land in one day at a cost of 8d. per acre. The fallowing cost me 2s. per acre for fuel and in one day I ploughed 40 acres with eight furrows.

During the seeding I hitched to a 12ft. 6in. Massey Combine and drilled 650 acres. I went over all kinds of soil, grey, red, boggy, stony, and stumps, and the CASE always held its own."

Included among the innumerable unsolicited testimonials we have received from CASE Tractor users all over Australia, may possibly be the experiences of farmers who have had to contend with conditions similar to those on your farm to-day. You can get the benefit of these experiences from our Book of Testimonials, Post Free on Application.

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POWER FARMING.

The Question of the Hour.

Question—*What other advantages can I obtain by using a CASE?*

Answer One of the greatest advantages of the tractor often overlooked is the higher standard of living resulting from its use. Farm machinery started the movement towards better farming. The tractor, by bringing about higher development of machine methods means a still better agriculture. Less drudgery for man and beast is one way in which the tractor promotes a higher standard of living. Whether ploughing, seeding, harvesting, or doing any other heavy work, the drudgery is either greatly reduced or eliminated. Accomplishing greater results in fewer hours gives the farmer more time for making needed farm improvements or for mixing socially with his neighbors. The tractor is doing for the farmer what improved power and machinery has done for manufacture—making the work easier and more orderly; increasing profits and making them more certain. The control of CASE tractor power makes the farmer less dependent upon conditions and ensures greater yields by giving him the upper hand of unfavorable weather.

Question — *Is the CASE suitable for a small farm such as mine?*

Answer The CASE tractor is made in four sizes, designed to meet the needs of the smallest or the largest farmers. All sizes of CASE Tractors are in use in Australia.

Question—*I would like to know more about the tractor; what it costs to work, and what other farmers are doing with it.*

Answer You can obtain further information, and copies of unsolicited testimonials from hundreds of farmers who use the CASE tractor by writing to

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"Loch Brae,"
OAKLANDS,
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To CASE Ltd.,

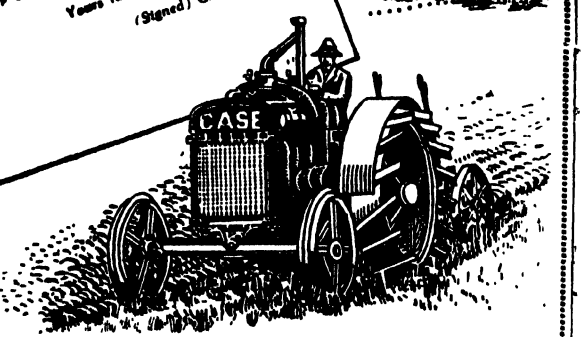
"I am pleased to say that the 15 27 CASE Tractor I purchased seven months ago has given me every satisfaction I do all my farm work with the Tractor, as I have only one draught horse and one big light horse on the place. I am keeping a record of the expenses for the year, and I think I am safe in saying that they will not exceed more than half of that of horses, and they are less work.

Through seeding I was using a 20 row Suntine, and for fallowing I used a 12 furrow plough, and it did both implements on top gear with ease."

Yours faithfully,
(Signed) G. BISHOP

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the bowels out thoroughly. Feed her subsequently on the sloppy feed for a few days after the effect of the drench has worked off. Put a handful of Epsom salts in the feed each day. Dissolve the salts in warm water, and use it to damp the feed. In addition to the sloppy feed, let her still have a ration of long hay of good quality.

"L. G. H.," Borrika, has horse turns round as far as possible to the near side, and raises the near hind leg off the ground. Lies down, and doubles up the front legs. When standing, paws the ground with off front leg.

Reply—The horse is suffering from chronic indigestion, with repeated attacks of mild colic. As a first step to procure a return to normal, I would recommend you to have his teeth attended to. They are almost certain to require dressing, and when this is done, he will be able to thoroughly chew the food and prepare it properly for digestion. Give the following drench:—Raw linseed oil 1½ pints, turpentine 2 oz., and see that this gives a good clearing out. Feed only on light sloppy food or green feed while this is working. After it has worked off, feed on light sloppy diet with not much dry hay. Supply the bulk instead with green feed. For a week put a handful of Epsom salts in the damp feed night and morning. Dissolve the salts in warm water, and use this to damp the feed. Put rock salt in the feedbox. Have the following powder made up:—P. nux vomica ¼lb., P. rad. gentian ½lb., P. zingib ½lb. Mix thoroughly together, and give him a tablespoonful twice a day, either in the feed, or if he will not take it that way —which is very probable—mix it in a spoonful of treacle, and smear the sticky mass on to the back of the tongue with a piece of flat stick, so that he has to lick it down, shortly before feeding.

"J. E. D.," Meningie, asks—(1) Cure for warts on cow's teats, (2) Preparation to encourage growth of hair on the tail and mane of mare, (3) Time that should elapse after a sow has weaned a litter and the next service.

Reply—(1) These may be greatly benefited or entirely removed by smearing them thickly with pure olive oil after each milking. If they persist they may be cut off with a pair of sharp scissors, and the sore touched with a stick of lunar caustic. They could then be oiled, and the caustic repeated as required, to prevent their renewed growth. (2) To stimulate growth of hair. Try the following:—Clip the hair as short as possible over the affected parts. Rub in vaseline or castor oil daily, and dress occasionally with the following liniment, which should be rubbed in well:—Tincture of cantharides 1 part, soap liniment 8 parts. (3) *Re* sow. Providing she is in good condition at the time she may be served at the first time she comes in season after weaning, or any subsequent time.

Hon. Secretary, Agricultural Bureau, Shoal Bay, reports bay horses with sores on nose and lips.

Reply—Bathe the sores with warm water and 1 per cent. lysol to remove any scabs or scales. After daubing them dry, apply tincture of iodine to them once a day.

"E. C. O.," Penong, reports stallion with enlarged penis and scrotum; the swelling also extends up the belly and chest, also mare in poor condition. When worked or roused, breathes very heavily.

Reply—*Re* stallion. It is impossible to definitely ascribe cause to the animal's condition, but it frequently occurs in stallions due to heavy feeding, lack of exercise, and excessive service. It may arise from a dirty sheath commencing irritation, from congestions of the penis, from blows or injuries. Satisfactory treatment generally results from the early administration of a good purgative, either an aloes ball or 1lb. to 1½lbs. Epsom salts as a drench. Subsequently the animal should be kept on sloppy diet, and receive a handful of Epsom salts in the food night and morning for a week. The inside of the sheath should be kept well cleaned out, and the swollen parts supported by a soft pad soaked in an astringent lotion such as a weak solution of alum, and kept in position by a suspensory bandage tied over the back and between the hind legs. Even the frequent application of cold water by douching from a bucket or applied from a hose is very beneficial. If abscess formation tends to occur, it should be hastened by warm fomentations, and the abscesses lanced to provide drainage for matter that forms. The wounds require to be subsequently treated with antiseptic solutions. The pressure pads and suspensory bandages are most essential parts of the treatment. The animal will probably recover the use of the penis as he

regains condition, and the swelling subsides. Give him a teaspoonful of powdered nux vomica night and morning for a week as a help to this end. Mix the powder with a little treacle or molasses, and smear the resulting sticky mass over the back teeth and tongue, using a piece of smooth flat stick to do it with. *Re* mare. It is quite possible that the animal has been strained internally, and has become touched in her wind (or broken-winded). There may be some heart derangement, too. Knock off the linseed oil treatment. She will require a good spell on good feed. She may have 1oz. of Fowler's solution of arsenic daily for 10 days, and then knock it off for a time. Have the following powder made up:—Powdered nux vomica ½lb.; powdered gentian radix ½lb., powdered ferri sulph. ½lb. Give one tablespoonful of this mixture twice a day, mixing the dose with a spoonful of treacle, and giving it the same way as advised for the stallion.

Hon. Secretary, Agricultural Bureau, Shoal Bay, reports (1) 12-year-old mare which discharges white fluid when working, and (2) bay gelding, 12 years old, with red film over each eyeball.

Reply—(1) The mare has a chronic septic metritis (of the breeding bag), and being of so long duration is not likely to be cured. The condition may be kept down and reduced by repeated flushings out of the breeding bag with warm normal saline solution (one teaspoonful of common salt to one pint of water). This should be injected into the breeding bag through a piece of rubber tubing (see that it is put into the breeding bag, and not just into the back passage). After injecting it into the organ, try to get it to run out again, and if it does not return freely of itself, you may have to massage and press down on the breeding bag by passing an oiled hand into the rectum. After the salt solution is emptied out, inject, if you can get it, about one pint of the following solution:— Iodine 1 part, potass. iod. 3 parts, water 100 parts. This may be allowed to remain in the breeding bag, and it will gradually work its way out again. Repeat this treatment every two or three weeks—a very convenient time would be when the mare is in season, if she shows that condition at all. (2) Try the following lotion:—Zinc sulphate 2 drs., boracic acid 1dr., distilled water 1 pint. Put a few drops of this lotion into the eyes four or five times a day, so that it runs all over the eyeball. Be sure to have it lukewarm before injecting. If possible, keep the horse in a dark box, or cover the eyes with a calico shade.

Hon. Secretary, Rapid Bay, asks—(1) Best age to put a young sow to the boar, (2) how long is a sow between periods, and (3) time between periods of heat in a ewe.

Reply—(1) A young sow should be at least 10 months old before being put to the boar. (2) Three weeks and she will remain "in season" for about three days. (3) An empty ewe will come "in season" again 17-20 days after she was last unsuccessfully served. She remains "in season" for one or two days only.

SUSPECTED POISONOUS PLANT.

Potina Agricultural Bureau forwards a few specimens of a plant which made its appearance in the district this year. Members of Bureau state that it is quite a new plant to them. Members were anxious to know whether this plant was dangerous to stock.

Reply—The plant forwarded has been identified by the Professor of Botany (Professor T. G. B. Osborn) as *Euphorbia drummondi*, a native weed widely spread over the State. It is commonly regarded as poisonous, but veterinary evidence as to its toxicity is not conclusive. The plant probably causes bloat if eaten by empty animals.

STRAWBERRY CULTURE.

Blackheath Agricultural Bureau asks which is the most profitable strawberry to grow.

The Horticultural Instructor (Mr. Geo. Quinn) says "Melba" is looked upon as the best general purpose strawberry grown here. The plants should be set out early in June in deeply dug soil which has had a good dressing of rotten farmyard manure or bonedust. For early fruit in cold districts, plant on an eastern to northern slope; in drier and hotter districts, set them on south-western to southern slopes, or in flats for preference.

BLACK APHIS.

"W. J. G.," Prospect Hill, forwarded a cherry leaf with some insects attached. He asked the best way to get rid of the pest.

The Horticultural Instructor (Mr. Geo. Quinn) says the insects are black aphis (*Myzus cerasi*), which are usually found attacking the peach, almond, Japanese plum, and in South Australia less often the cherry trees, although, as the specific name implies, in Europe it habitually infests the cherry trees. The best remedy is tobacco and soap solution put on warm, repeating the dose two or three times with intervals of about two days between. If tobacco extracts are not available use kerosine emulsion, or even hot soapsuds made by dissolving 2ozs. Sunlight soap to the gallon of water.

TAKE-ALL INFECTION.

The Yadnarie Branch of the Agricultural Bureau asks:—"Is seed wheat taken from a crop which was badly infested with take-all more subject to disease the following year than seed taken from a non-infested crop?"

The Lecturer in Plant Pathology at the University (Mr. Geoffrey Samuel, B.Sc.) supplies the following information:—

I have to state that wheat taken from a crop which was badly infested with take-all will not, if properly cleaned, be more subject to disease the following year on that account. The following points should be noticed in this connection, however:—

(1) Infection by the disease can be carried through the smallest pieces of leaf-sheath or straw from the bases of diseased plants, so that wheat stripped and winnowed from a heap in the middle of a paddock is more likely to contain infection than wheat gathered with a harvester. I should think that pickling would get rid of much of this infection; but no experiments have been done on this.

(2) There will be a considerable amount of partially shrivelled grain from infected plants near the edge of the take-all patches. This grain does not carry the take-all infection, but would not be expected to be such good seed as plump grain.

(3) Late wheats, *i.e.*, those sown early, seem more liable to infection than the later-sown wheats; for if there is take-all in the land much of it germinates with the first rains, and dies if it finds no wheat to grow upon. Later-sown wheats may thus escape much infection to which earlier-sown wheats would succumb.

SCAB ON APRICOTS.

Blackheath Agricultural Bureau asks—"Is there any effective method of preventing or removing the scab from apricots?"

The Horticultural Instructor (Mr. Geo. Quinn) advises spraying the trees with Burgundy or Bordeaux mixture just when the leaves have nearly all fallen in autumn, before pruning, and again in spring when the flowers are commencing to open.

WHOLE MEAL BREAD.

Blackheath Agricultural Bureau asks—"Where wheat is ground on the farm for making whole meal bread, is one variety of wheat better adapted than another?"

The Departmental Miller (Mr. G. H. Stevens) intimates that little definite information is available on this point. In making white bread it is found that a mixture of strong and weak flours gives the best results, and he suggests following the same practice in the case of whole meal. The main essential, however, in his opinion, is to select a good, clean, and plump sample of wheat, and, if necessary, to wash and thoroughly dry it.

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Maximum Crops at Minimum Cost.

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CURRIE STREET.

ROSEWORTHY AGRICULTURAL COLLEGE HARVEST REPORT, 1923-1924.

[By W. J. COLEBATCH, B.Sc., M.R.C.V.S., Principal; R. C. SCOTT, Experimentalist, and E. L. ORCHARD, Farm Superintendent.]

(*Continued from page* 851.)

BARLEY CROP.

As intimated at the commencement of this report, the season precluded us from sowing barley in the farm fields. We had, however, an area of 5.35 acres under this crop in one of the experimental fields, and moderate yields were obtained. The average return over this area was 19bush. 37lbs., which brings the mean barley yield for the past 20 years to 28bush. 21lbs. per acre.

TABLE XVI.—*Showing Yields of Various Species and Varieties of Barley*, 1923.

Variety.	Selection.	Area. Acres.	Total Yield. B.	L.	Acre Yield. B.	L.
Malting Barleys—						
Prior	4	0.710	16	32	23	32
Stucky	1	0.373	8	38	23	24
Duckbill	1	0.610	9	46	16	13
Larsen 32	1	0.970	12	16	12	35
Totals.		2.663	47	32	17	41
Cape Barleys—						
Short Head	17	0.138	4	25	32	30
Roseworthy Oregon	16	1.022	24	36	24	9
Roseworthy Oregon	14	1.528	28	36	18	40
Totals		2.688	57	47	21	28
Grand totals		5.351	105	29	19	37

TABLE XVII.—*Showing General Average Barley Yields on the College Farm.* 1904-1923.

Season.	Rainfall. "Useful." Inches.	Total. Inches.	Area. Acres.	Average Yield per Acre. Bush.	lbs.
1904	11.60	14.70	27.86	38	33
1905	14.23	16.71	65.73	25	4
1906	16.31	19.73	51.00	40	38
1907	13.96	15.13	79.30	31	21
1908	15.52	17.75	94.83	43	49
1909	21.15	24.05	75 27	35	0
1910	16.79	23.87	113.42	37	9
1911	9.45	13.68	76.09	39	31
1912	13 05	14.97	123.82	22	21
1913	10.82	15.66	91.09	12	19
1914	6.12	9.36	12.85	2	26
1915	18.33	19 76	24.44	41	40
1916	20.25	23.23	128.198	12	15
1917	17.25	21.86	126.053	40	46
1918	10.53	12.01	109.660	23	5
1919	8.22	12.38	56.385	17	15
1920	16.76	19.30	105.010	21	30
1921	12.98	17.16	66.698	26	25
1922	14.90	20.00	54.103	37	38
1923	25.30	27.46	5.351	19	37
Mean for 20 years				28	21

OAT HARVEST.

Encouraged by the interest created amongst farmers by the introduction of new types of oats, the area under this cereal on the College farm has been gradually enlarged, and last year amounted to upwards of 100 acres. The demand for seed has been very keen, and although we have endeavored to place clients in the way of

securing supplies from other growers, many have been unable to obtain seed. It would be well if those who have been fortunate enough to procure clean seed were to acquaint the College with the amount of seed they have available for sale after next harvest, in order that their names may be given to applicants who lodge orders after our own surplus has been exhausted. With so many varieties to handle we cannot find room for large plots, and consequently are compelled to disappoint many who desire to purchase College seed. This position would be largely obviated if the plan suggested were acted upon, and it should have the effect of assisting growers to dispose of their grain at advantageous prices.

The average yield from all plots comprised in the 106 acres was 30bush. 23lbs., and the mean return for the 20-year period ending 1923 was 23bush. 37lbs. These figures are not high, but it must be remembered that Roseworthy is not an ideal oat-growing district, and varieties that do even moderately well here will usually give a much better account of themselves under cooler conditions. On the whole, however, the oaten crop of last season was above the average, although in other years individual yields have been higher.

TABLE XVIII.—*Showing the Average Oat Yield for the Period* 1905-1923.

Season.	Rainfall. "Useful." Inches.	Rainfall. Total. Inches.	Area. Acres.	Yield per Acre. Bush.	Yield per Acre. lbs
1905	14.23	16.71	20.00	43	10
1906	16.31	19.73	33 50	41	18
1907	13.96	15.13	20.00	—	
1908	15.52	17.75	20.00	22	28
1909	21.15	24.05	23 52	43	19
1910	16.79	23.87	24.60	28	15
1911	9 45	13.68	22 82	22	8
1912	13.05	14.97	52.00	10	4
1913	10.82	15.66	3.33	11	36
1914	6.12	9.36	—	—	
1915	18.33	19.76	1.10	32	32
1916	20.25	23.23	6.36	27	15
1917	17.25	21.86	20.88	14	25
1918	10.53	12 01	35.99	31	4
1919	8 22	12.38	36.51	10	17
1920	16.76	19.30	33.83	29	37
1921	17.98	17.16	55.40	25	22
1922	14.90	20.00	79.33	28	29
1923	25.30	27.41	106.70	30	22
Mean for 20 years				23	37

Fourteen varieties were grown on Flett's field, and the returns ranged from 38bush. 31lbs. in the case of Sunrise to 20bush. 7lbs. from Yarran. The Sunrise plot was a very small one—less than half an

acre—and this fact must be considered when comparisons are being made on the basis of the figures given in the appended table. Usually this variety proves only a moderate grain yielder, although it is a splendid oat for hay or ensilage. Setting aside Sunrise, it will be seen that Kherson and Scotch Grey gave the highest yields of grain, and the Algerian plot returned only 2-3bush. less. It is in the very wet seasons that Algerian oats do best in this district, and consequently we did not expect to find the newer types much in advance this year; but under normal conditions they reap the advantage of brisk early growth, and their quick-maturing habit enables them to mature well-filled grain when the slower growing Algerian type is struggling against adverse ripening conditions. Lachlan and Early Burt, though less prolific than one or two others this year, have again given good results, as also have Guyra and Mulga. In the final column of the yield table will be found the mean returns for several seasons, and notice should be taken of these figures, as they may now be taken as reliable indications of the grain-yielding propensities of the different varieties under our soil and weather conditions.

TABLE XIX.—*Showing Yields of Varieties of Oats*, 1918-1922.

Variety.	1918.		1919.		1920.		1921.		1922.		1923.		Means.	
	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.
Lachlan	—		42	29	57	6	41	22	39	20	31	19	42	19
Scotch Grey	49	17	31	12	55	15	30	23	22	4	35	35	37	18
Early Burt	—		48	3	36	27	26	15	31	1	28	34	34	8
Kherson	29	29	22	19	55	9	25	16	32	8	37	9	33	28
Kelsall's	17	28	33	3	49	2	39	1	27	27	20	19	31	7
Sunrise	25	33	15	27	46	4	26	13	25	32	38	31	29	30
Algerian	—		—		—		—		21	35	33	36	27	36
Guyra	—		16	1	55	29	13	37	23	20	27	20	27	13
Bathurst Early	—		37	16	31	7	19	9	17	19	20	17	25	6
Mulga	—		—		20	0	24	1	22	23	31	29	24	23
Quandong	—		—		36	4	12	39	20	12	23	25	23	10
Yarran	—		21	15	34	21	14	6	29	29	20	7	22	0
New Zealand Cape	—		—		—		—		17	18	24	31	21	5
Glen Innes, No. 1	—		—		—		—		—		26	39	—	

The last table given in this section brings together the mean hay and grain returns for ready comparison. The position held by Lachlan, Scotch Grey, and Early Burt have not been altered by the recent harvest. Taking into consideration both hay and grain yields, Early Burt must be regarded as the best general purpose oat we have grown, but the advantages it possesses over Lachlan and Scotch Grey are not such as to warrant the opinion that the latter two will always prove inferior to it. Even on the College farm it is not at all improbable that as the trials go on the mean yields of these three oats will come much closer together, and under entirely different circumstances it

would not surprise us to learn that their relative positions had changed. We have, however, been working long enough with these varieties to be able to recommend them freely to farmers for both hay and grain. What is even more important to those who keep sheep is that they are all rapid growers from the start, and if sown early in the autumn (April), regardless of whether rain has fallen or not, they can be relied upon to furnish useful feed for ewes and lambs.

TABLE XX.—*Giving Average Hay and Grain Yields of Oat Varieties.*

Variety.	Hay per Acre. Period.	T.	C.	L.	Period.	Grain per Acre. B.	L.
Lachlan	1921-1923	2	11	17	1919-1923	42	19
Scotch Grey	1921-1923	2	13	2	1918-1923	37	18
Early Burt	1921-1923	3	2	11	1919-1923	34	8
Kherson	1921-1923	2	11	49	1918-1923	33	28
Kelsall's	1921-1922	2	13	2	1918-1922	31	7
Sunrise	1921-1923	2	15	109	1918-1923	29	30
Algerian	1922-1923	2	5	58	1922-1923	27	36
Bathurst Early	1921-1923	2	11	71	1919-1923	25	6
Mulga	1923	3	0	2	1920-1923	24	23
Quandong	1923	2	18	34	1920-1923	23	10
Yarran	1922-1923	2	15	8	1919-1923	22	0

WHEAT HARVEST.

Wheat can adapt itself to climatic and soil conditions better than most crops, but even some of our most approved varieties failed to survive the trying circumstances which surrounded them last season. At the outset plans were laid for the sowing of about 300 acres of wheat, but only 170 acres of the fallow was utilised. The balance had to be abandoned owing to inundations, and an effort was then made to keep some of the varieties going by drilling freshly ploughed stubbles. In this, however, we were only partially successful, the drills having to be brought home without completing the amended programme. The total area sown was 184 acres, and the average return worked out at 15¾bush., or practically 2bush. below the mean wheat yield for the preceding 20 years. It will be noticed in the summary that in three fields—Daly's B and C, Flett's A and No. 6C—the yields were well above the mean, whilst in the remaining two the crops were failures. It is not always an easy matter to account for the differences revealed in these tables, but in this instance it is possible to throw light on the question. In No. 5B, two small plots were cut out of a hay crop, as the grain crop area reserved for these varieties could not be sown. The crop in Grainger's B was a very early wheat, and in consequence was sown last. Weather conditions at that time were very adverse, the soil was saturated, the seed germinated poorly, and a very thin plant resulted.



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No. 6C is a field 24 acres in area; but we had to cease work after drilling about two-thirds of it. Fortunately, the dry side of the field was under crop, and although the stand was not very thick the ears filled well, and the return was satisfactory.

In the two larger fields seeding was finished by the end of May under fairly good conditions, and, moreover, the land in Flett's being of a light sandy character, is better adapted for growing crops in wet years than most of the farm fields. The highest yield amongst the bulk wheats was 22bush. 35lbs., from King's White in Daly's B and C, which was seeded during the first week of May. The remainder of this field that was allowed to stand for grain consisted of rising land, and was therefore less injured by an overplus of soil moisture than the crops in No. 6C and Grainger's B. It is unfortunate that the circumstances under which the records are taken cannot be brought more under control. The accidental factor is bound to impair the value of the season's results, since the allocation of the varieties to the different fields is naturally determined by such considerations as ease of management and convenience at harvest rather than by any attempt to fit them to any particular environment. The effects of untoward circumstances, however, whilst important from the point of view of the seasonal averages, do not seriously affect the mean figures derived from a long series of harvests. It will be noticed, for example, that Early Gluyas—one of the best grain wheats for early districts—yielded less than 10bush. this harvest, yet its mean return for nine years has only fallen from 23bush. 54lbs. to 22bush. 21lbs. Hence the importance of long continued trials in the quest for reliable grain-yielding varieties.

TABLE XXI.—*Summary of Wheat Harvest*, 1923.

	Area. Acres.	Total Yield. B.	L.	Acre Yield. B.	L.
Farm crops—					
Daly's B and C . .	68.990	1,411	32	20	28
Flett's A	41.138	797	44	19	23
No. 6C	15.008	274	12	18	16
No. 5B	2.153	18	7	8	25
Grainger's B . . .	31.535	154	35	4	54
Totals	158.824	2,656	10	16	43
Experimental plots— (1 acre and over). . .	25.305	241	58	9	34
Totals	184.129	2,898	8	15	44
Experimental plots— (under 1 acre)	5.054	49	51	9	52
Grand totals .	189.183	2,947	59	15	35

TABLE XXII.—*Showing the Average Yields of Wheat on the College Farm,* 1904-1923.

Season.	Rainfall. "Useful." Inches.	Rainfall. Total. Inches.	Area Under Wheat. Acres.	Average Yield per Acre. Bush.	lbs.
1904	11.60	14.70	330.00	18	3
1905	14.23	16.71	212.00	24	11
1906	16.31	19.73	318.00	14	30
1907	13.96	15.13	178.00	13	20
1908	15.52	17.75	258.52	22	14
1909	21.15	24.05	328.47	25	5
1910	16.79	23.87	267.35	16	38
1911	9.45	13.68	234.98	14	17
1912	13.05	14.97	232.89	19	36
1913	10.82	15.66	333.07	6	32
1914	6.12	9.36	148.69	11	28
1915	18.33	19.76	367.271	21	13
1916	20.25	23.23	330.937	24	44
1917	17.25	21.86	353.473	17	32
1918	10.53	12.01	320.326	17	36
1919	8.22	12.38	329.957	9	22
1920	16.76	19.30	341.542	26	57
1921	12.98	17.16	286.393	16	56
1922	14.90	20.00	305.078	16	6
1923	25.30	27.46	184.129	15	44
Mean for 20 years				17	36

YIELDS OF CHIEF VARIETIES.

Generally speaking, the later ripening and consequently earlier sown varieties yielded better results than earlier kinds. There were, of course, exceptions to this, as, for instance, Maharajah, which heads the list with 25½bush. per acre. Similarly Rajah, an early mid-season wheat, gave us 23bush. 51lbs., whilst Ford yielded 19bush. 30lbs.

Of the late wheats Yandilla King comes first with 23bush. 15lbs., and is closely followed with Marshall's No. 3, which returned 20bush. 31lbs.

The popular variety—Sultan—fell below its usual place for the year, but, notwithstanding this, it has proved the most prolific grain yielder over the past six years. In general, the order in which the other varieties appear has not been modified to any appreciable extent. It will be observed, on reference to the mean figures, the later varieties are still found congregating at the bottom of the list.

TABLE XXIII.—*Showing Yields of Chief Varieties of Wheat Grown as Farm Crops*, 1915-1923.

Variety.	1918.	1919.	1920.	1921.	1922.	1923.	Means.	Period.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	
Sultan	35 15	19 51	28 11	17 6	24 12	12 0	22 29	1917-23
Early Gluyas	14 53	9 56	34 25	30 57	20 49	9 50	22 21	1915-23
Caliph	27 29	15 54	27 46	21 20	27 28	13 48	21 24	1915-23
President	30 4	18 41	25 22	11 47	28 27	18 16	21 7	1917-23
Ford	14 32	19 12	25 23	15 18	20 46	19 30	20 46	1916-23
Early Crossbred 53	15 41	9 21	38 5	15 5	21 46	16 51	20 43	1917-23
King's White	15 30	13 54	22 20	13 16	22 55	22 35	20 21	1915-23
Rajah	19 27	19 7	25 46	9 27	22 48	23 51	19 48	1917-23
Felix	22 20	20 41	28 8	9 38	28 21	8 14	19 32	1917-23
Maharajah	15 22	16 25	27 45	11 20	20 52	25 30	19 29	1917-23
Faun	18 8	26 7	23 53	20 55	17 53	16 33	19 24	1917-23
Yandilla King	19 10	9 47	27 36	9 47	24 12	23 15	18 32	1915-23
Queen Fan	17 3	5 19	22 47	21 15	23 37	13 39	18 28	1915-23
Late Gluyas	18 12	5 11	26 29	23 25	17 18	6 6	18 1	1915-23
Federation	14 8	6 58	25 18	16 44	20 0	21 30	16 43	1917-23
Marshall's No. 3	16 43	8 35	28 17	11 14	27 32	20 31	16 2	1915-23

TABLE XXIV.—*Giving Average Hay and Grain Yields of Wheat Varieties.*

Variety.	Period.	Hay per Acre.			Period.	Grain per Acre.	
		T.	C.	L.		B.	L.
Sultan	1920-23	2	6	85	1917-23	22	29
Caliph	1921-23	2	2	30	1915-23	21	24
President	1920-23	2	2	80	1917-23	21	7
Early Crossbred 53	1920-23	2	5	19	1917-23	20	43
King's White	1920-23	2	6	0	1915-23	20	21
Rajah	1921-23	2	8	14	1917-23	19	48
Felix	1920-23	2	5	79	1917-23	19	32
Maharajah	1921-23	2	7	71	1917-23	19	29

TABLE XXV.—*Showing Yields of Latest Strains of College Selected Wheats.*

Variety.	Selection.	1919.	1920.	1921.	1922.	1923.	Means.	Period
		B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	
Dan	5	39 34	22 6	24 39	20 16	15 28	24 25	1919-23
Sultan	7	22 47	26 46	22 6	24 12	5 8	22 26	1917-23
Caliph	8	19 56	29 11	16 10	27 28	13 48	22 35	1916-23
Ford	9	19 12	25 23	22 58	25 33	7 30	22 6	1916-23
President	7	20 23	28 4	21 3	28 27	6 26	21 23	1917-23
Felix	7	20 41	27 10	22 59	28 21	5 20	20 54	1917-23
King's White	18	21 40	32 39	15 49	22 55	15 2	20 22	1909-23
Fortune	9	14 58	22 21	13 2	23 38	5 0	19 45	1916-23
Emperor	7	16 40	14 41	15 30	26 12	12 16	19 38	1917-23
Queen Fan	14	17 36	20 41	17 11	23 37	8 45	19 17	1910-23
Federation	15	12 37	17 59	16 33	20 0	11 12	18 51	1909-23
Faun	8	20 41	27 20	21 21	17 53	8 31	18 45	1917-23
Rajah	7	17 35	19 53	14 32	22 48	17 37	18 34	1917-23
Gluyas	18	20 42	22 4	17 0	20 49	9 50	18 31	1909-23
Marshall's No. 3	17	18 11	19 43	18 23	27 32	6 45	18 12	1909-23
Maharajah	7	23 23	15 31	19 6	20 52	10 56	17 43	1917-23
Gypsy	5	22 10	23 50	14 49	21 21	6 14	17 41	1919-23
Yandilla King	12	11 58	25 12	16 0	24 12	15 46	17 24	1912-23
Late Gluyas	18	20 35	26 33	14 58	17 18	6 6	17 24	1909-23
Early Crossbred 53	8	19 10	24 14	14 5	16 56	3 40	16 51	1917-22

Interesting particulars of the new crossbreds raised at the College are given in Table XXVI. Several of the 1919 crossbreds give promise of developing into attractive types, but attention is specially directed towards the Federation and Gluyas cross, which was found to be storm resisting to a greater extent than any Gluyas crossbred previously produced here. It is hoped that this wheat, either directly or indirectly, will enable us to place on the market strains that will combine the high yielding capacity of Gluyas with the rigidity of straw so characteristic of Federation.

TABLE XXVI.—*Showing Yields of Some New College Crossbred Wheats.*

Variety.	Selection.	Pedigree.		Yield per Acre. 1920 B. L.	1921. B. L.	1922. B. L.	1923. B. L.	Means B. L.
Nizam	1	Emperor x Caliph	(1916)	28 30	22 39	24 22	13 20	22 13
Nawab	4	Anvil x Sultan	(1916)	26 20	23 50	25 10	5 14	20 9
Regent.	4	Rajah x Gluyas	(1916)	23 27	18 19	23 38	14 44	20 2
KII II.	2	Ford x Florence	(1918)	—	—	21 53	16 59	19 26
Gluford	2	Ford x Gluyas	(1918)	—	—	20 25	10 33	15 29
KF II..	2	Argentine White x Bonus	(1918)	—	—	19 6	10 28	14 47
J.P. III.	1	Felix x Tunis	(1918)	-	—	—	13 20	
	1	Federation x Gluyas	(1919)	--	—	—	31 49	
	1	Federation x Late Gluyas	(1919)	—	—	—	30 13	
	1	Crossbred 53 x Sultan	(1919)	-	—	—	30 0	
	1	Federation x Queen Fan	(1919)	—	—	—	29 3	
	1	Crossbred 53 x Caliph	(1919)	-	—	—	27 47	
	1	Crossbred 53 x President	(1919)	-	—	—	25 0	

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ALDEHYDE IN FORTIFYING SPIRITS.

[By A. T. JEFFERIS, B.Sc. (State Agricultural Chemist), and C. S. PIPER, B.Sc. (Assistant Chemist), Roseworthy College.]

Statutory regulation 84 of the Excise Act, amended this year by regulation 19, stipulates that spirit used for fortifying wine must contain less than 75 milligrams of acetic aldehyde per litre of absolute alcohol.

In view of the fact that many distillers in this State and elsewhere have found it difficult to keep economically within this limit, some investigations have been made at the Roseworthy College laboratory, the results of which have been thought of sufficient interest to embody in this note.

In the first place, it will be as well to examine aldehyde in its relation to alcohol and acetic acid from a chemical standpoint.

When ordinary or ethyl alcohol is oxidised the first product is acetic aldehyde. On further oxidation acetic acid is formed. These reactions may be expressed by the two equations:—

(1) $C_2H_5OH + O = CH_3COH + H_2O$

Alcohol and oxygen = aldehyde and water.

(2) $CH_3COH + O = CH_3COOH$.

Aldehyde and oxygen = acetic acid.

A little aldehyde is always formed in the fermenting vat, together with traces of acetic acid, while on standing in wood additional aldehyde is developed. Therefore if an older wine be distilled the product will contain considerably more aldehyde than that of a newly made wine. That such is the case can be seen from a comparison of this season's wine with that of 1917, which stood for two years in wood before bottling. From a litre each of new and old Doradillo wine the following results were obtained, on distillation, 100 c.c. being collected as foreshots:—

Vintage.	Foreshots, 100 c.c.			Hearts, Feints, and Residue, 900 c.c.			Total, 1,000 c.c.		
	Alcohol by Vol.	Aldehyde.	Aldehyde per Lit. of Alc.	Alcohol by Vol.	Aldehyde.	Aldehyde per Lit of Alc.	Alcohol by Vol.	Aldehyde.	Aldehyde per Lit. of Alc.
	c.c.	mgs.	mgs.	c.c.	mgs.	mgs.	c.c.	mgs.	mgs.
1924	56	11	196	32	2	62	88	13	147
1917	59	18	306	56	10	178	115	28	244

Since aldehyde is the intermediate oxidation product between alcohol and acid, it should be produced on the souring of a wine. The following tests show this to be the case. The young Doradillo used above was inoculated with vinegar bacteria and allowed to stand in a warm place. The increase of acidity and aldehyde was noted:—

	Acidity as Sulphuric Acid.	Increase of Acidity	Aldehyde per Litre of Wine.	Increase of Aldehyde.
	Mgs. per lit.			
1924. Doradillo, sound	4,704	—	13	—
1924. After five days	7,840	3,136	27	14
1924. After seven days	10,976	6,272	32	19
1924. After nine days	16,270	11,566	32	19

It has been contended that the use of an oxidising agent, such as potassium permanganate, previous to distillation or rectification will eliminate the aldehydes by oxidising them to acetic acid, and the custom amongst some distillers has been to add permanganate at the rate of 1lb. per hundred gallons to the neutralized wine, or to the distillate some hours before rectification. Though this action may take place, it is unfortunately more than counterbalanced by the additional oxidation of alcohol to aldehyde.

The following tests carried out on some rectified spirit purchased by the College will demonstrate this. Permanganate was added to the spirit in the proportion of 1lb. per 100galls., and after four hours standing the whole was distilled and the aldehyde contents determined. As the oxidising power of permanganate varies considerably with the neutrality of the solution, the spirit was treated in three portions:—

(*a*) Acid.—Sulphuric acid added at the rate of 1gram per litre

(*b*) Neutral.—The spirit was slightly acid and was made exactly neutral to phenolphthalein.

(*c*) Alkaline.—Caustic soda was added at the rate of 1 gram per litre.

	Original Spirit.	Permanganate Added.		
		Acid.	Neutral.	Alkaline.
Total aldehyde in mgs. per litre of absolute alcohol	22	119	67	37
Increase in aldehyde	—	97	45	15

This was repeated with permanganate at the rate of 3lbs. per 100galls.

	Original Spirit.	Acid	Neutral.	Alkaline
Total aldehyde in mgs. per litre of absolute alcohol	22	222	130	60
Increase of aldehyde	—	200	108	38

The estimations were made colorimetrically with the use of Schiff's reagent. It appears, therefore, that—

(*a*) The use of potassium permanganate increases the aldehyde contents of a spirit.

(*b*) The increase varies greatly with the neutrality of the solution.

(*c*) The increase is in a measure proportional to the amount of permanganate used.

On using potassium dichromate in the place of permanganate similar results were obtained.

To test the possibility of converting the aldehyde to alcohol by the action of a reducing agent, tests were made with ferrous sulphate and oxalic acid. Negative results were obtained in each case.

Physical Methods.

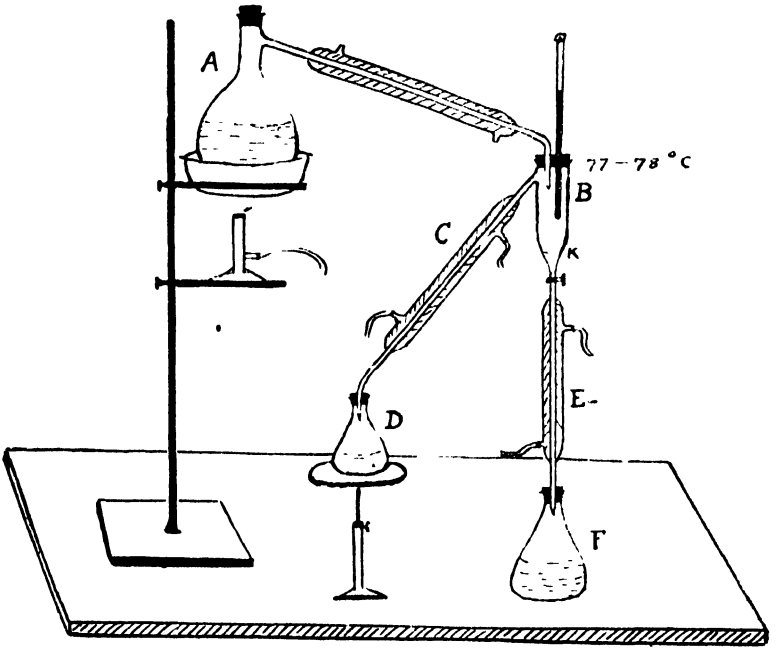
Acetic aldehydye has a boiling point of 21° C., while that of ethyl alcohol is 78° C. The vapour pressure of the former in solution is considerably in excess of that of alcohol, and on exposure at a raised temperature much aldehyde should be expelled.

Spirit containing 4,000 milligrams per litre of aldehyde was exposed to the air at a temperature of 60° C. for three-quarters of an hour. The aldehyde was reduced to 700 milligrams, but there was also a loss of 50 per cent. of alcohol.

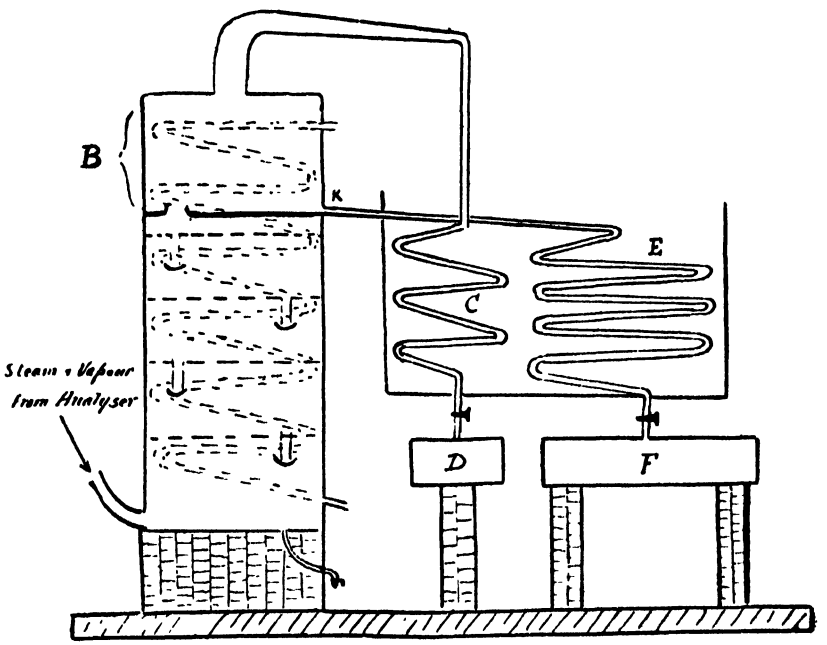
An apparatus was then arranged, as shown in diagram 1, to conserve this loss. In the first place the condenser E was omitted and the spirit condensing in B dropped hot into the open vessel F. The lighter portions of the distillate were condensed, caught in D, and constantly returned to still A. The final result of the distillation was as follows:—

	Per Cent Alcohol by Volume.	Milligrams Aldehyde per Litre of Absolute Alcohol.
	Per Cent.	
300 c.c. spirit distilled in A	91	880
240 c.c. distillate in F	90	280
45 c.c. heads, D	92	3,000

Decrease of aldehyde in main distillate 600 milligrams per litre.
Loss of alcohol, 5½ per cent.; loss of aldehyde, 24½ per cent.



Diag. I



Diag. II

In industrial distillation the heads can be continually returned to the still. There must come a time, however, when their aldehyde contents have so increased that the resulting spirit would be too highly contaminated, and the heads must then be discarded.

The apparatus shown in diagram 1, if used continuously, is in many respects similar to a "Coffey" still, as may be seen by reference to diagram 2. The various parts are lettered the same as the corresponding parts in diagram 1.

It is suggested that by increasing the temperature of C and allowing the distillate to drop while warm into an open vessel, a large portion of the aldehyde would be lost in transit, and the contents of D could be returned to the still for a much longer period.

In the "Coffey" still this might be effected by shortening condenser coil C and lowering tank D. It is thus shown that by a process of distillation whereby the alcohol is condensed and withdrawn from the mixed vapors, at a raised temperature, an effective separation from aldehyde will result. As a matter of fact, continuous stills of the "Coffey" type are not giving much trouble in respect to aldehyde.

With the pot-still, however, the case is otherwise, as the "fore-shots," representing about 10 per cent. of the distillate and a greater per cent. of the total alcohol, may contain from 800 to 2,000 milligrams per litre of aldehyde, and unless the subsequent rectification is very efficient in eliminating this, it is advisable to discard the "fore-shots." They can certainly be utilised for vinegar by those running such a process in connection with their stills, but as the Excise allows only 2½ per cent. loss during distillation, the man without a vinegar plant and working a pot-still or some other type where the aldehyde is not eliminated is at a considerable disadvantage.

Summary.

1. The formation of small quantities of aldehyde by the oxidation of alcohol in a fermenting must is a normal process and aldehyde is consequently present in new wine.

2. This process continues during the maturing of a wine and the percentage of aldehyde rises.

3. When a wine sours additional quantities of aldehyde are formed.

4. The use of oxidising agents, such as potassium permanganate and dichromate, will not eliminate the aldehyde from a wine or spirit, but only results in an increase. This increase varies greatly with the neutrality of the liquor treated, and is roughly proportional to the amount of oxidising agent used.

5. Treatment with reducing agents, such as ferrous sulphate and oxalic acid, does not influence the aldehyde.

6. If a wine or spirit be subjected to fractional condensation the aldehyde contents of the main distillate are low, and the heads containing the bulk of the aldehyde can be continuously returned to the still until they are so high as to effect the main condensate.

7. Continuous stills of the "Coffey" type can be so arranged as to allow of the production of a fortifying spirit conforming to the Excise standard regarding aldehyde without undue loss of spirit. With pot-stills the difficulty is greater, particularly where the original wine contains a fair amount of aldehyde, as in the case, on the one hand, with well-matured wine, and on the other, with sour wine.

Thanks are due to the following gentlemen for their advice:—Mr. C. R. Churchward, State chief analyst, Customs; Mr. D. G. Quinn, State viticulturist, Roseworthy College; Messrs. Seppelt Bros., vignerons, Seppeltsfield.

BOOBOROWIE EXPERIMENTAL FARM HARVEST REPORT.

[By E. A. Bristow, Manager.]

This farm is situated 120 miles north of Adelaide, and contains 1,484 acres, with an altitude of 1,200ft. to 2,000ft. It consists of two blocks—one, the old North Booborowie homestead, is "high" land, running to the highest point in Brown's Hill Range, and part of the stock road, and containing 1,186 acres; the other (block No. 478), situated two miles from the homestead, containing 298 acres of comparatively level land, which in times of heavy rains is flooded by water from the Tumela Creek. This farm is situated in the centre of a very good district, which contains land suitable for (1) cereal growing, (2) lucerne growing without irrigation, and (3) some first-class grazing land not arable. Typical cereal-growing land and grazing land constitute this farm, and although the recently acquired block of the stock road adjoining the eastern boundary of the homestead block contains about 20 acres of second-class lucerne land, unfortunately it does not include any of the first-class lucerne-growing land, of which many thousands of acres are to be found in this district, because in the growing and handling of this crop there is urgent need for experimental investigation.

The Season 1923.

To the end of April only 57 points of rain were registered, but the dry spell ceased on the 5th of May, and good rains followed for the rest of the season as follows:—May, 2.77in.; June, 2.77in.; July,

4.28in.; August, 2.50in.; September, 3.17in.; October, 2.30in.; November, 0.28in.; and December, 2.53in. As will be noted the seeding and fallowing months were extremely wet, which rendered seeding operations very difficult. The total rainfall for the year was 21.17in.

Rainfall Distribution at Booborowie, 1900-1923.

	Means, 1900-1918.	1919.	1920.	1921.	1922.	1923.	Means 1900-1923.
	In.	In.	In.	In.	In.	In.	In.
January	0·49	0·23	0·22	1·25	1·23	0·26	0·52
February	0·46	2·56	—	1·12	1·09	—	0·57
March	0·82	0·05	0·51	1·75	0·15	0·15	0·76
April	1·00	1·35	0·79	—	1·69	0·16	0·96
May	1·64	2·42	0·96	2·47	4·14	2·77	1·83
June	2·51	2·25	4·27	2·92	1·58	2·77	2·56
July	2·00	1·36	1·88	2·46	3·31	4·28	2·14
August	2·12	2·01	3·52	2·38	2·50	2·50	2·22
September	2·11	2·09	2·57	2·79	1·63	3·17	2·18
October	1·68	1·44	2·11	1·60	0·70	2·30	1·67
November	1·06	0·85	3·47	0·84	0·96	0·28	1·07
December	0·93	1·78	1·92	0·92	2·24	2·53	1·13
Total	16·83	18·39	22·22	20·50	20·32	21·17	17·60
"Useful" rainfall (April-November)	14·12	13·77	19·57	15·46	15·61	18·23	14·62

The total rainfall for the year must be considered good; it is above the average, as is also the "useful" rain.

Distribution of "Useful" Rainfall, Booborowie, 1900-1923.

	1923.	1900-23. Means.
	Inches.	Inches.
Seeding rains (April-May)	2.93	2.79
Winter rains (June-July)	7.05	4.70
Spring rains (August-October)	7.97	6.07
Early summer rains (November)	0.28	1.07
	18.23	14.63

Crops.

The continuous rains during May and June made seeding operations extremely difficult, and a considerable amount of the wheat sown was drilled under boggy conditions, and weeds could not be killed.

Ensilage Crop.—Field No. 14, which was fallowed in 1921, and carried a wheat crop in 1922, was cultivated during May 3rd and 4th, drilled from 5th to 7th with 80lbs. of Calcutta oats and 1cwt. of super per acre. This crop made fair growth, and the whole of the field, an area of 8.72 acres, was cut. Part of Field 15, an area of 5.62 acres, was also cut for ensilage, making a total of 14.34 acres, yielding 75 tons, averaging 5 tons 4cwts. 67lbs. per acre.

Hay Crops.—The area devoted to cereals for hay was 76.07 acres. Some stubble land was sown with oats. Field 15 was sown with Calcutta oats, seeded at the rate of 80lbs. and 1cwt. of super per acre. Field 7 was sown with Calcutta oats, seeded at the rate of 80lbs. and 1cwt. of super per acre. Field 4 was sown with 75lbs. of Crossbred 53 and 2cwts. of super per acre on fallow land. Part of Field 23, was sown with various wheats at the rate of 75lbs. and 2cwts. of super per acre on fallow land, and was also cut for hay. The yields of hay obtained from the various fields are set out in the next table:—

Hay Yields, Booborowie, 1923.

Kind.	Field. Grown. No.	Area. Acres.	Total Yield. T.	C.	L.	Yield per Acre. T.	C.	L.
Wheat crop	2 & 3	10.28	45	0	0	4	7	61
Wheat crop	4	16.66	57	0	0	3	8	48
Calcutta oats	7	9.3	15	0	0	1	12	29
Calcutta oats	15	6.67	10	10	0	1	11	54
Wheat headlands	11	2.64	6	0	0	2	5	51
Wheat crop	23	27.06	75	0	0	2	17	85
Wheat headlands	Exp. plots	2.28						
Wheat headlands	27	1.18	7	0	0	2	0	52
Farm average		76.07	215	10	0	2	16	74

The yields obtained must be considered good, although crops grown under such favorable conditions could hardly be otherwise.

Hay Returns, Booborowie, 1912-1923.

Year	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. T.	C.	L.	Yield per Acre T.	C.	L
1912	15.50	13.20	70.00	132	5	0	1	18	88
1913	15.07	10.88	76.00	109	14	0	1	8	97
1914	9.76	7.79	—	Failure				—	
1915	17.14	15.95	52.27	144	15	0	2	15	43
1916	22.41	20.28	37.93	109	14	0	2	17	94
1917	26.70	21.02	58.43	198	19	0	3	8	11
1918	13.87	11.98	51.41	107	0	0	2	1	70
1919	18.39	13.77	75 75	117	0	0	1	10	100
1920	22.22	19.57	75.64	225	0	0	2	19	55
1921	20 50	15.46	47 41	98	0	0	2	1	38
1922	20.32	15.61	88.38	168	0	0	1	18	2
1923	21.17	18.23	76.07	215	10	0	2	16	74
Means	18.59	15.31	—		—		2	3	9

Oat Crops.—Only a small area was devoted to oats for grain, and all oats were sown on stubble land. Field 24 was fallowed in 1921, and carried a wheat crop in 1922; was sown early in May with Scotch Grey and Algerian oats at the rate of 80lbs. and 1cwt. of super per acre. Field 9B was fallowed in 1921, and carried a wheat crop in

1922, and was sown with Calcutta oats early in May at the rate of 80lbs. seed and 1cwt. super per acre. The yields received from the oats crops are shown in the table below, with the total and average return for the season:—

Oat Yields, Booborowie, 1923.

Variety.	Field Grown	Area Acres	Total Yield Bush. lbs.	Yield per Acre. Bush. lbs.
Scotch Grey ..	No. 24	10.04	270 9	26 37
Algerian	No. 24	5.9	125 7	21 9
Scotch Grey	Exp. plots	3.17	116 30	36 33
Calcutta	No. 9A	5.19	142 38	27 22
Farm average ..	—	24.30	655 4	26 38

Oat Returns, Booborowie, 1913-1923.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
1913	15.07	10.86	54.00	1,394 13	32 11
1914	9.76	7.79	—	Failure	—
1915	17.14	15.95	75.47	2,410 20	31 38
1916	22.41	20.28	4.23	138 33	32 33
1917	26.70	21.02	4.68	231 25	49 20
1918	13.87	11.98	31.93	863 27	27 2
1919	18.39	13.77	22.40	451 18	20 6
1920	22.22	19.57	19.24	843 20	43 34
1921 .	20.50	15.46	18.72	445 19	23 32
1922	20.32	15.61	22.89	579 6	25 12
1923	21.17	18.23	24.30	655 4	26 38
Means	18.87	15.50	—	—	28 21

Only two varieties of oats have been grown continuously for the past few years, and the yields secured since 1916 are set out in the next table:—

Oat Varieties, Booborowie, 1916-1923.

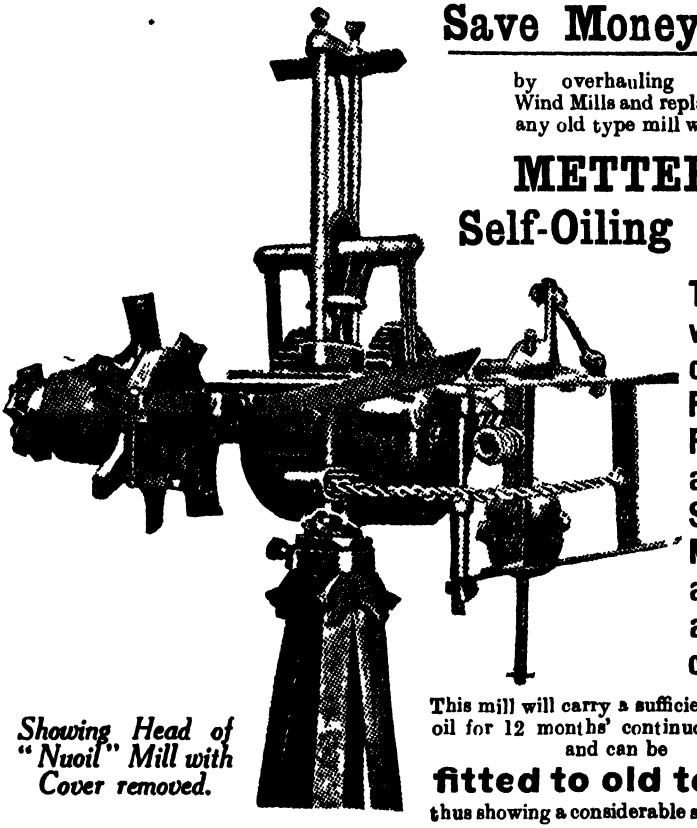
Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Scotch Grey. Bush. lbs.	Calcutta. Bush. lbs	Farm Average. Bush. lbs.
1916	22.41	20.28	49 21	28 20	32 33
1917	26.70	21.02	61 20	44 29	49 20
1918	13.87	11.98	33 19	27 8	27 2
1919	18.39	13.77	22 24	21 5	20 6
1920	22.22	19.57	42 30	46 16	43 34
1921	20.50	15.46	32 8	19 8	23 32
1922	20.32	15.61	28 9	23 4	25 12
1923	21.17	18.23	29 12	27 22	26 38
Means	20.70	16.99	37 18	29 29	31 7

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Barley Crops.—All barley was sown on stubble land at the rate of 60lbs. of seed and 1cwt. of super per acre. Field 24 was cultivated and sown during the last half of June. Details of this year's barley crops are shown in the next table:—

Barley Yields, Booborowie, 1923.

Variety.	Field Grown.	Area Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
Short Head	No. 24	32.11	580 42	18 4
Roseworthy Oregon	Exp. plots	2.89	30 35	10 31
Farm average		35.00	611 27	17 24

The barley in Field 24 went down so badly that I estimate we only obtained about one-half of the grain. Apart from the crop going down, the heads broke at the first node, making it impossible to get the grain with a reaper thresher, even with every alternate tooth out.

One of the rotation plots, with an area of 1.5553 acres, sown with barley No. 36, yielded only 3bush. 17lbs. per acre, having been almost completely destroyed by dandelions.

Barley Returns, Booborowie, 1915-1923.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
1915	17.14	15.95	3.09	108 26	35 6
1916	22.41	20.28	35.93	1,119 46	31 8
1917	26.70	21.02	23.65	914 26	38 33
1918	13.87	11.98	29.11	1,045 23	35 46
1919	18.39	13.77	32.58	501 1	15 19
1920	22.22	19.57	35.39	1,087 38	30 37
1921	20.50	15.46	52.52	1,454 5	27 34
1922	20.32	15.61	38.53	1,014 35	26 17
1923	21.17	18.23	35.00	611 27	17 24
Means	20.30	16.87	—	—	28 36

Wheat Crops.—As usual, an assortment of wheat varieties was grown this season. The table setting out the yields of the different kinds shows that the best crop produced a yield of 39bush. 12lbs. per acre, whereas the poorest did not yield higher than 16bush. 29lbs. per acre. Testing varieties is essentially one of the operations of an experimental farm, but it has the inevitable effect of reducing the wheat yields considerably below those that could be expected were only the highest yielding varieties grown. All wheat crops were

grown on fallowed land, and the fields which carried these crops were treated as follows:—

Field 23.—This field carried oats and barley in 1920, and barley in 1921. It was fallowed between the 13th and 14th of August, 1922, rolled, harrowed, and cultivated from September 20th to 25th, cultivated and drilled in between June 7th and 20th with 75lbs. of seed and 2cwts. super per acre.

Field 27.—This field carried a crop of barley in 1920, was pastured during 1921, and fallowed in 1922 between July 3rd and 14th. It was cultivated between 2nd and 3rd of October, cultivated and drilled from May 25th to 28th with 75lbs. seed and 2cwts. super per acre.

Field 4.—This field was pastured during 1921, fallowed between August 24th and 29th, 1922, harrowed September 9th, cultivated October 9th to 12th, cultivated and drilled from May 19th to 25th with 75lbs. seed and 2cwts. super per acre.

Field 11.—This field was sown for pasture during 1921, was fallowed from August 29th to September 2nd, 1922, harrowed on the 5th September, cultivated and drilled from June 21st to 22nd with 75lbs. seed and 2cwts. super per acre.

Wheat Variety Yields, Booborowie, 1923

Variety.	Field Grown.	Area Acres.	Total Yield. Bush.	lbs.	Yield per Acre. Bush.	lbs.
Yandilla King	23	2.29	89	47	39	12
Federation	4	2.00	74	30	37	15
Federation	Exp. plots	34.00	1,148	59	33	48
Marshall's No. 3	23	2.38	79	0	33	12
Federation	Exp. plots	22.65	740	30	32	42
Caliph	23	2.14	67	13	31	25
Major	27	16.27	502	49	30	54
Major	11	1.81	54	18	30	0
Onas	23	2.84	83	40	29	28
Hard Federation	23	3.52	101	33	28	51
King's White	23	2.19	62	25	28	30
Currawa	23	1.65	45	28	27	33
Queen Fan	23	2.21	60	45	27	29
Yandilla King	11	2.03	54	27	26	49
Queen Fan	11	1.65	43	54	26	36
Leak's Rustproof	23	0.70	18	25	26	19
Gluyas	11	4.04	98	38	24	25
Marshall's No. 3	11	1.59	37	35	23	38
Crossbred 53	11	1.74	28	41	16	29
Farm average		107.70	3,392	37	31	30

The average wheat yield of 31bush. 30lbs. per acre must be considered good when low-yielding varieties are grown along with heavy-yielding varieties.

Wheat Returns, Booborowie, 1912-1923.

Year	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres	Total Yield Bush.	lbs.	Yield per Acre Bush.	lbs.
1912	15.50	13.20	180.00	4,645	20	25	48
1913	15.07	10.86	388.75	6,611	53	17	0
1914	9.76	7.79	339.75	990	58	2	55
1915	17.14	15.95	284.28	7,765	2	27	19
1916	22.41	20.28	216.67	7,668	40	35	24
1917	26.70	21.02	153.22	4,984	30	32	32
1918	13.87	11.98	173.81	4,631	32	26	39
1919	18.39	13.77	113.84	3,041	15	26	43
1920	22.22	19.57	91.51	2,937	17	32	5
1921	20.50	15.46	103.10	2,112	32	20	29
1922	20.32	15.61	66.85	1,840	13	27	32
1923	21.17	18.23	107.70	3,392	37	31	30
Means	18.59	15.31	—	—		25	30

The average yield of 25bush. 30lbs. per acre for the 12-year period, 1912 to 1923, is very satisfactory considering 1914 approached a failure, and that a number of varieties that are not suitable to the district have to be grown. Judging on the basis of the above figures, it can be taken that with an application of 2cwts. of super on well-worked fallowed land, the average annual yielding capacity of this neighborhood, when suitable varieties are grown, is in the vicinity of 30bush. per acre.

Yields of Wheat Varieties, Booborowie, 1916-1923.

	Means, 1916-1918.	1919.	1920.	1921.	1922.	1923.	Means, 1919-1923.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
Major	—	31 47	46 14	28 9	29 48	30 49	33 21
Federation	36 26	26 29	31 12	19 1	27 45	33 29	27 35
Leak's Rustproof	*24 0	29 39	29 4	23 25	15 40	26 19	24 49
Crossbred 53	*25 8	21 9	28 59	17 21	23 0	16 29	21 24
Onas	35 40	24 52	38 23	25 41	Crops destroyed by fire.	29 28	
Yandilla King	32 24	30 28	41 8	25 59		33 23	
Queen Fan	29 51	24 6	35 13	21 9		27 7	
Caliph	24 48	31 14	33 27	25 53		31 25	
Marshall's No. 3	29 9	29 26	33 38	13 10		29 22	
Gluyas	24 57	31 15	31 58	21 44		24 45	
King's Red	24 45	23 53	35 15	22 57			
Minister	*34 6	26 54	34 38	22 26			
Currawa						27 33	
Hard Federation						28 51	
King's White						28 30	

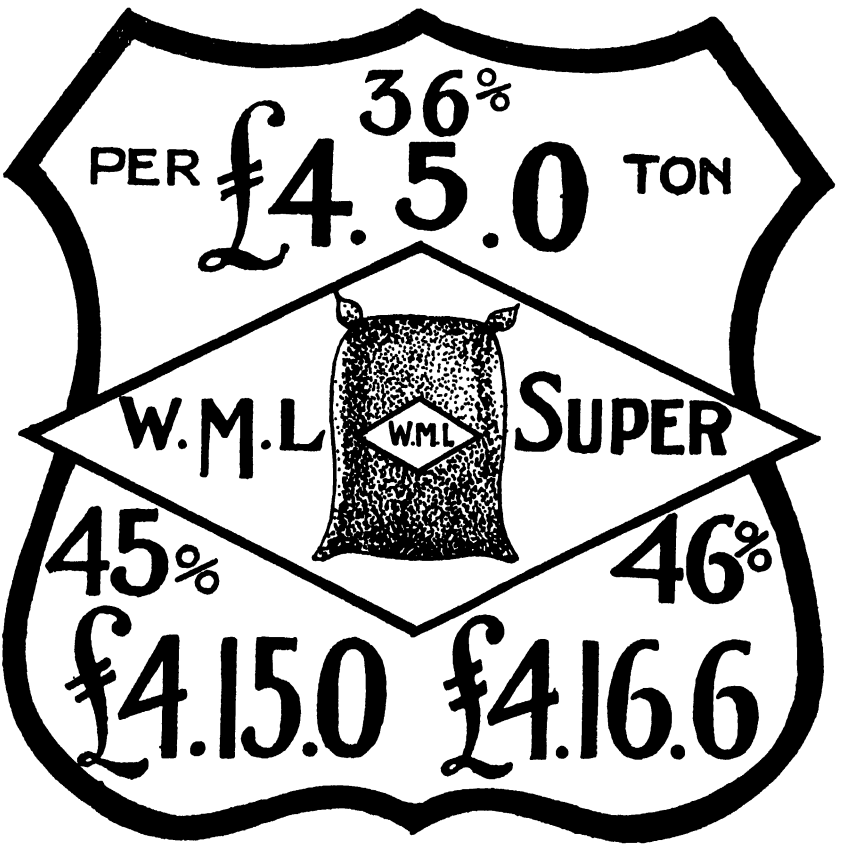
*1918 only.

Permanent Experimental Plots.

Instead of placing experimental plots in different fields each year, the policy of permanent plots has been adopted, with the idea of eliminating residual effects of fertilisers.

Bare Fallow-Wheat Experiments.

Various series of permanent experiments dealing with wheat in bare fallow-wheat rotation, and covering manurial, cultivation, and depth of ploughing tests were mapped out in 1915. The plots carried their first crops in 1916. The plots are so arranged that one-half of each is fallowed every alternate year, the half fallowed one year carrying a crop the following year, and *vice versa*. For the eight years that these plots have been cropped, Federation wheat has been used on all plots



Permanent Manurial Plots, Booborowie, 1916-1923.

Plot.
1. ½cwt. superphosphate.
2. 1cwt. superphosphate.
3. 2cwts. superphosphate.
4. 3cwts. superphosphate.
5. No manure.
6. 1cwt. super, ½cwt. nitrate of soda (spring).
7. 2cwts. super, ½cwt. nitrate of soda (spring).
8. 1cwt. super, ½cwt. sulphate of ammonia (seeding).
9. 2cwts. super, ½cwt. sulphate of ammonia (seeding).
10. 1cwt. super, ½cwt. muriate of potash (seeding).
11. 2cwts. super, ½cwt. muriate of potash (seeding).
12. 2cwts. super, ½cwt. muriate of potash (seeding), ½cwt. nitrate of soda (spring).
13. 1cwt. superphosphate.
14. No manure.
15. 1cwt. basic slag.
16. 2cwts. basic slag.
17. 10 tons farmyard manure.
18. 10 tons farmyard manure, 2cwts. super.
19. 10 tons farmyard manure, 2cwts. super, ½cwt. muriate of potash.
20. 2cwts. super, 4cwts. gypsum.
21. 2cwts. super, 5cwts. lime.
22. 2cwts. super (half at ploughing).
23. 2cwts. super (half at ploughing), ½cwt. nitrate of soda (spring).

75lbs. of Federation seed used per acre on all plots.

	Yield per Acre.								Means.
	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1916-23.
Plot.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
1	36 58	28 23	23 28	26 50	30 11	11 52	23 25	31 5	26 32
2	38 57	28 14	34 27	29 3	29 52	13 45	27 34	35 40	29 42
3	39 3	30 5	40 50	28 16	28 31	19 40	32 29	35 33	31 48
4	38 0	29 20	41 4	30 39	32 6	18 39	35 11	36 41	32 43
5	32 58	27 39	24 24	17 32	23 29	5 25	13 11	28 21	21 36
6	40 18	34 50	35 38	27 34	32 56	18 17	26 45	36 45	31 38
7	40 50	34 36	36 33	31 35	32 5	19 14	26 2	34 22	31 55
8	41 25	31 18	32 33	28 53	33 39	17 22	28 45	36 14	31 16
9	38 11	36 13	34 28	29 33	30 48	21 21	26 25	35 7	31 31
10	40 50	32 31	34 44	28 9	28 44	12 13	26 31	35 31	29 54
11	44 1	30 54	34 41	29 0	29 20	19 26	28 10	33 51	31 10
12	40 34	34 28	36 31	29 7	30 8	19 58	30 42	35 49	32 10
13	40 11	34 55	34 18	25 58	29 36	17 6	28 57	32 7	30 23
14	40 9	28 31	24 36	14 6	21 9	3 9	12 53	28 45	21 40
15	41 55	34 14	28 49	22 26	28 30	21 47	24 30	36 58	29 54
16	42 23	39 43	28 10	27 47	29 22	21 46	24 19	35 52	31 10
17	40 7	31 26	28 25	28 8	29 49	12 5	26 10	37 28	29 12
18	41 44	32 41	32 40	32 17	28 43	21 0	27 37	36 26	31 39
19	42 5	31 56	32 0	32 12	33 34	20 16	27 42	37 10	32 7
20	41 8	31 36	33 12	29 13	28 43	20 29	29 25	31 51	30 42
21	45 58	35 38	31 3	29 36	29 15	19 51	29 52	32 36	31 44
22	40 40	32 18	30 16	31 52	28 59	18 44	27 35	33 15	30 5
23	41 31	32 20	31 55	35 3	31 20	18 0	28 37	34 20	30 51

These manurial tests with wheat have been conducted continuously the past six seasons, and in such a series of seasons and in these particular soil conditions, they appear to indicate that:—

1.—A ½cwt. dressing of superphosphate gives an increase of 4bush. 54lbs. of wheat per acre over and above the yield received from wheat grown without manure.

2.—A dressing of 1cwt. of superphosphate gives an increased yield of 8bush. 25lbs. per acre.

3.—A 2cwts. dressing of superphosphate gives an increase of 10bush. 10lbs. per acre.

4.—A 3cwts. dressing of superphosphate gives an increase of 11bush. 5lbs. per acre.

5.—A dressing of 1cwt. superphosphate gives an increase of 3bush. 31lbs. over and above that received from a ½cwt. dressing of superphosphate.

6.—A dressing of 2cwts. of superphosphate gives an increase of 5bush. 16lbs. over a ½cwt. dressing.

7.—A dressing of 3cwts. of superphosphate gives an increase of 6bush. 11lbs. over a ½cwt. dressing.

8.—A dressing of 2cwts. superphosphate gives an increase of 1bush. 45lbs. over and above that received from a dressing of 1cwt. superphosphate.

9.—A dressing of 3cwts. superphosphate gives an increase of 2bush. 40lbs. over a 1cwt. application.

10.—A 3cwts. dressing of superphosphate gives an increase of 55lbs. over and above that received from a 2cwts. application of superphosphate.

11.—An application of 1cwt. basic slag gives an increase of 8bush. 16lbs. over the no-manure plots.

12.—An application of 2cwts. basic slag gives an increase of 9bush. 32lbs. over the no-manure plots.

13.—A dressing of 2cwts. basic slag gives an increase of 1bush. 16lbs. over a 1cwt. application of basic slag.

14.—The addition of ½cwt. nitrate of soda to a dressing of 1cwt. superphosphate gives an increase of 1bush. 35lbs. per acre.

15.—The addition of ½cwt. of nitrate of soda to a dressing of 2cwts. superphosphate gives an increase of 7lbs. per acre.

16.—An application of ½cwt. sulphate of ammonia added to 1cwt. of superphosphate gives an increase of 1bush. 13lbs. per acre.

17.—An application of ½cwt. sulphate of ammonia added to a 2cwts. dressing of superphosphate results in a loss of 17lbs. per acre.

18.—A ½cwt. dressing of muriate of potash in addition to 1cwt. superphosphate results in a loss of 9lbs. per acre.

19.—A ½cwt. dressing of muriate of potash in addition to 2cwts. superphosphate results in a loss of 38lbs. per acre.

20.—The addition of ½cwt. muriate of potash and ½cwt. nitrate of soda to 2cwts. superphosphate gives an increase of 22lbs. per acre. The addition of ½cwt. muriate of potash gives an increase of 15lbs.

over the superphosphate and nitrate of soda. The addition of ½cwt. nitrate of soda gives an increase of 1bush. over the superphosphate and muriate of potash dressing.

21.—Ten tons of farmyard manure per acre gives an increase of 7bush. 34lbs. of wheat over no-manure, at a minimum cost of £4 for the fertiliser.

22.—Ten tons of farmyard manure and 2cwts. superphosphate per acre gives a yield of 9lbs. of wheat less than that received from a dressing of 2cwts. superphosphate alone. The addition of ½cwt. muriate of potash to 2cwts. superphosphate and 10 tons farmyard manure only gives an increase of 28lbs. per acre.

23.—The addition of 4cwts. of gypsum to the dressing of 2cwts. of superphosphate results in a loss of 1bush. 6lbs. of wheat per acre.

24.—The addition of 5cwts. of lime to a dressing of 2cwts. superphosphate results in a loss of 4lbs. per acre at a minimum extra cost of 8s. for lime.

25.—Putting half of the superphosphate into the land at ploughing time, and at the depth of ploughing, does not give an increase over the method of putting all of the superphosphate in with the seed, when 2cwts. of superphosphate is used to the acre.

26.—The addition of ½cwt. of nitrate of soda to 2cwts. of superphosphate, when half the latter fertiliser is put in the soil at ploughing time only gives an increase of 46lbs. per acre.

Money Value of Increase.

Owing to the varying prices of both grain and fertilisers, it is quite impossible to put a correct value on the increases obtained from the different fertilisers, but if we take figures about 25 per cent. in advance of pre-war prices, we can compare the results as shown below. In the following table the prices used to arrive at the values of grain increases are:—

	s.	*d.*	
Wheat	3	9	per bush.
Superphosphate	5	0	per cwt.
Basic slag	5	0	per cwt.
Nitrate of soda	18	0	per cwt.
Sulphate of ammonia	16	0	per cwt.
Muriate of potash	18	0	per cwt.
Farmyard manure	8	0	per ton
Gypsum	2	0	per cwt.
Lime	32	0	per ton

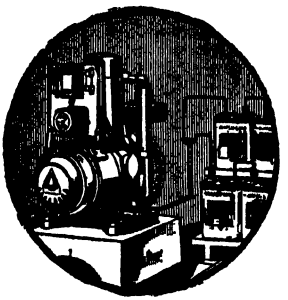
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MONEY VALUE OF INCREASE—*continued.*

Addition of—	To—	Gives Increase of—	Increase at 3s. 9d. per Bush.	Cost of Extra Outlay.	Profit per Acre.
		B. L.	s. d.	s. d.	s. d.
½cwt. super.	No manure	4 54	18 5	2 6	15 11
1cwt. super.	No manure	8 25	31 7	5 0	26 7
2cwts. super.	No manure	10 10	38 2	10 0	28 2
3cwts. super.	No manure	11 5	41 7	15 0	26 7
½cwt. super.	½cwt. super.	3 31	13 2	2 6	10 8
1½cwts. super.	½cwt. super.	5 16	19 9	7 6	12 3
2½cwts. super.	½cwt. super.	6 11	23 2	12 6	10 8
1cwt. super.	1cwt. super.	1 45	6 7	5 0	1 7
2cwts. super.	1cwt. super.	2 40	10 0	10 0	—
1cwt. super.	2cwts. super.	0 55	3 5	5 0	Loss
1cwt. basic slag	No manure	8 16	31 0	5 0	26 0
2cwts. basic slag	No manure	9 32	35 9	10 0	25 9
1cwt. basic slag	1cwt. basic slag	1 16	4 9	5 0	Loss
½cwt. nitrate of soda	1cwt. super.	1 35	5 11	9 0	Loss
½cwt. nitrate of soda	2cwts. super.	0 7	0 5	9 0	Loss
½cwt. sulphate of ammonia	1cwt. super.	1 13	4 7	8 0	Loss
½cwt sulphate of ammonia	2cwts. super.	*—	—	8 0	Loss
½cwt. muriate of potash	1cwt. super.	†—	—	9 0	Loss
½cwt. muriate of potash	2cwts. super.	‡—	—	9 0	Loss
½cwt. muriate of potash and ½cwt. nitrate of soda	2cwts. super.	0 22	1 5	18 0	Loss
½cwt. muriate of potash	2cwts. super. and ½cwt. nitrate of soda	0 15	0 11	9 0	Loss
½cwt. nitrate of soda	2cwts. super. and ½cwt. muriate of potash	1 0	3 9	9 0	Loss
10 tons farmyard manure.	No manure	7 34	28 5	80 0	Loss
10 tons farmyard manure.	2cwts. super.	§—	—	80 0	Loss
½cwt. muriate of potash	10 tons farmyard manure and 2cwts. super.	0 28	1 9	9 0	Loss
4cwts. gypsum	2cwts. super.	‖—	—	8 0	Loss
5cwts. lime	2cwts. super.	¶—	—	8 0	Loss

* 17lbs. decrease. † 9lbs. decrease. ‡ 38lbs. decrease. § 9lbs. decrease.
‖ 1bush. 6lbs. decrease. ¶ 4lbs. decrease.

Permanent Cultivation Plots, Booborowie, 1916-1923.

All plots dressed with 2cwts. superphosphate per acre.

Plot. Treatment.

Early Fallow (July)—

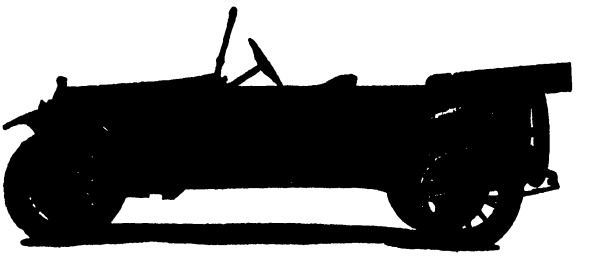
24. Ploughed 6in., harrowed immediately. Cultivated or harrowed whenever necessary.
25. Ploughed 6in., left untouched during winter. Cultivated or harrowed whenever necessary.
26. Ploughed 6in., rolled immediately. Cultivated or harrowed whenever necessary.
27. Ploughed 6in., skim ploughed after rain. Cultivated or harrowed whenever necessary.

Late fal'ow (after September 1st)—

28. Ploughed 3in. Cultivated or harrowed whenever necessary; not rolled.
29. Ploughed 6in. Rolled same day as ploughed. Cultivated according to requirements.

Autumn Ploughing—

30. Ploughed 4in. at seeding, not fallowed, and immediately rolled.



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Permanent Cultivation Plots, Booborowie, 1916-1923—continued.

Plot.	Yield per Acre. 1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	Means, 1916-23.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
24	40 48	31 33	31 44	28 30	30 29	19 14	28 25	34 26	30 39
25	41 4	35 52	33 56	28 45	29 19	19 30	30 9	34 0	31 34
26	33 25	33 14	29 34	27 31	28 26	20 40	27 43	34 8	29 20
27	41 1	33 47	32 24	25 53	27 57	19 27	29 34	32 48	30 21
28	35 38	32 29	31 28	26 35	29 6	17 15	22 18	31 0	28 14
29	37 45	30 56	31 25	26 39	28 46	16 34	24 53	29 57	28 22
30	35 49	24 3	28 12	17 58	26 30	9 29	18 45	22 35	22 55

Permanent Depth of Ploughing Plots, Booborowie, 1916-1923.

All plots dressed with 2cwts. superphosphate per acre.

Plot. Depth of Ploughing.

31. Ploughed 3in. deep.
32. Ploughed 6in. deep.
33. Ploughed 9in. deep.
34. Ploughed 9in. deep. To be then twice ploughed 3in. deep before again ploughing 9in. deep.

Plot.	Yield per Acre. 1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	Means, 1916-23.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
31	39 51	28 20	33 38	27 25	28 23	19 56	26 22	31 7	29 23
32	37 13	31 24	32 42	27 1	28 50	21 24	28 44	34 2	30 10
33	33 54	33 17	32 23	27 20	29 19	20 44	27 38	35 45	30 3
34	33 44*	—	30 35†	—	29 34†	—	24 4*	—	29 29
	—	32 13*	—	27 36†	—	20 44†	—	*37 24	—

* 9in. ploughing. † 3in. ploughing.

The tests, comparing different methods of cultivating land for wheat growing, show that where the same variety of wheat is grown and the same manuring practised at Booborowie, for a series of seasons, such as the past eight:—

1. Bare fallowing the land early or late, and any subsequent method of cultivation, increases the yield above non-fallow to the extent of from 3bush. 20lbs. to 8bush. 39lbs. per acre.

2. The biggest returns are obtained from fallowed land prepared according to the recognised practice of the district, *i.e.*, ploughing early (July), leaving rough throughout the winter, then cultivating or harrowing whenever weeds or a surface crust render it necessary.

3. Harrowing the land immediately after ploughing appears to have a depressing effect to the extent of about 1bush. per acre in the yield.

4. Rolling immediately after early ploughing (July) appears to have a depressing effect on the yield to the extent of, approximately, 2bush. per acre.

5. Skim ploughing the fallowed land after the first rain does not increase the yield received from ordinary fallow treatment.

6. Land ploughed in July in preparing the bare fallow gives an increase of 3bush. 20lbs. per acre over the yield received from land ploughed in September.

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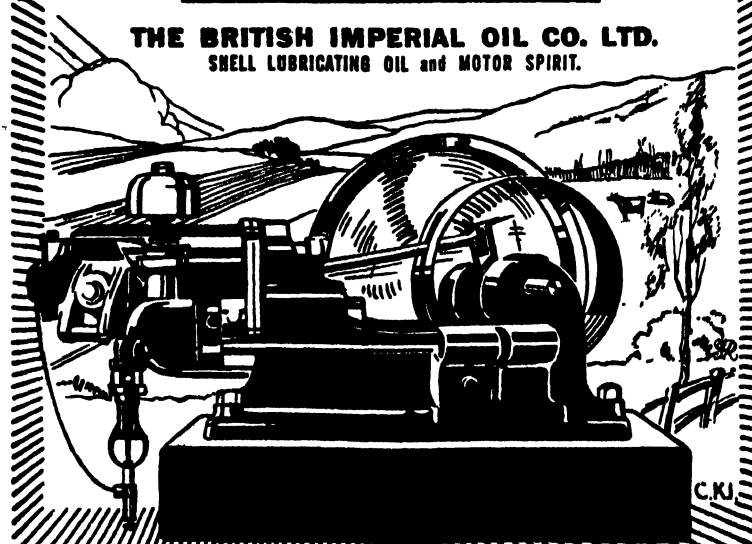
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7. September ploughing gives about equal yields whether ploughed shallow (3in.) and not rolled or ploughed deep (6in.) and heavily rolled the same day.

8. The depth to which land is ploughed between 3in. and 9in. has had but little effect on the yields of wheat crops in this locality up till the present.

Rotation of Crops.—Experimental Plots.

Several series of permanent experimental plots were planned in 1915, and all of these have been continued since that time. The field chosen for the rotation plots was, fortunately, bare fallowed in 1914, so that the crops and records for these crops commence from that year.

Rotation Plots, Booborowie, 1915-1923.

	1915.		1916.		1917.		1918.		1919.		1920.		1921.		1922.		1923.		Means, 1915-23.	
	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.
Series I.—Plots 1 and 2. *Bare fallow—Wheat (2cwts. super).*																				
Wheat .	29	42	30	28	32	22	23	10	23	5	28	9	24	0	30	29	32	38	28	14
Series II.—Plots 3 and 4. *Sorghum—Wheat (2cwts. super).*																				
Wheat .	34	44	31	20	31	50	19	49	24	37	31	50	16	37	30	8	28	41	27	44
Series IIIa.—Plots 5 to 7. *Pasture—Bare fallow—Wheat (no manure).*																				
Wheat .	29	5	28	45	25	40	15	40	20	6	22	17	16	44	16	56	18	53	21	34
Series IIIb.—Plots 8 to 10. *Pasture—Bare fallow—Wheat (½cwt. super).*																				
Wheat .	37	9	37	47	35	10	26	5	29	53	35	54	23	14	33	18	33	24	32	26
Series IIIc.—Plots 11 to 13. *Pasture—Bare fallow—Wheat (1cwt. super).*																				
Wheat .	38	51	39	17	36	6	27	56	28	22	35	51	22	36	38	24	33	1	33	23
Series IIId.—Plots 14 to 16. *Pasture—Bare fallow—Wheat (2cwts super).*																				
Wheat .	37	6	39	30	36	48	23	55	28	41	33	1	23	43	30	43	31	25	31	39
Series IIIe.—Plots 17 to 19. *Pasture—Bare fallow—Wheat (3cwts. super).*																				
Wheat .	39	40	40	0	32	58	25	43	27	26	32	17	25	1	34	43	25	34	31	29
Series IVa.—Plots 20 to 22. *Bare fallow—Wheat (2cwts. super)—Bar'ey (1cwt. super).*																				
Wheat .	37	37	43	40	38	33	27	6	25	13	33	25	22	22	33	23	29	11	32	16
Barley	27	48	26	27	18	5	27	17	1	18	20	13	15	45	29	43	19	3	20	35

Rotation Plots, Booborowie, 1915-1923—continued.

	1915.	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	Means, 1915-23.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
Series IVB.—Plots 23 to 25.										
Bare fallow—Wheat (2cwts. super)—Oats (1cwt. super).										
Wheat .	34 0	42 25	41 52	28 18	26 26	38 6	20 27	31 4	39 27	33 34
Oats. .	31 9	33 23	45 32	43 18	14 30	42 32	34 8	38 7	36 28	35 26
Series IVC.—Plots 26 to 28.										
Bare fallow—Wheat (2cwts. super)—Peas (1cwt. super).										
Wheat	36 24	42 41	39 37	24 2	28 39	37 24	20 41	33 2	39 33	33 34
Series IVD.—Plots 29 to 31.										
Bare fallow—Wheat (2cwts. super)—Rape (1cwt. super).										
Wheat .	31 52	44 54	45 27	23 11	24 16	35 20	21 3	24 57	40 37	32 24
Series V.—Plots 32 to 33.										
Bare fallow—Wheat (2cwts. super).										
Wheat	34 52	44 47	38 44	29 31	22 18	33 40	24 51	24 16	32 15	31 42
Series VIA.—Plots 34 to 37.										
Pasture—Bare fallow—Wheat (2cwts. super)—Barley (2cwts. super)										
Wheat .	35 1	49 5	37 56	27 19	27 24	33 12	19 57	23 31	33 39	31 54
Barley	41 7	34 16	27 43	37 28	14 5	24 1	14 49	32 25	3 17	25 27
Series VIB.—Plots 38 to 41.										
Pasture—Bare fallow—Wheat (2cwts. super)—Oats (2cwts. super).										
Wheat .	35 49	48 42	39 25	28 54	28 11	36 57	22 52	29 50	33 17	33 46
Oats . .	40 20	23 5	43 24	41 3	12 13	38 27	19 21	33 1	36 27	32 2
Series VII.—Plots 42 to 46.										
Bare fallow—Wheat (2cwts. super)—Lucerne—Lucerne—Lucerne.										
Wheat .	33 37	33 47	41 37	33 30	28 1	36 40	22 7	31 48	35 37	33 0
Series VIII.—Plots 47 to 50.										
Bare fallow—Wheat (2cwts. super)—Rye grass—Rye grass.										
Wheat .	22 0	47 30	32 45	25 26	23 45	32 19	21 7	31 48	32.05	29.52

Seed Used on Rotation Plots, 1923.

Wheat—Federation	75lbs. per acre.
Barley—Roseworthy Oregon . .	50lbs. per acre.
Oats—Scotch Grey	80lbs. per acre.
Peas—Early Dun	100lbs. per acre.
Rape—Dwarf Essex	5lbs. per acre.
Lucerne—Hunter River	6lbs. per acre.
Rye Grass—Italian	9½lbs. per acre.
Sorghum—Sudan Grass	6lbs. per acre.

Grazing Crops in Rotation Plots.

Sheep per acre.

	1917.	1918.	1919.	1920.	1921.	1922.	1923.	Means, 1917-1923.
SERIES II.—								
Sorghum . .	2.90	2.13	5.43	4.59	3.68	3.17	2.57	3.50
SERIES IIIA.—								
Pasture after wheat without manure .	0.89	0.57	2.61	4.21	3.90	2.23	3.45	2.55
SERIES IIIB.—								
Pasture after wheat with ½cwt. super ..	1.28	0.99	2.61	3.60	4.15	3.42	4.09	2.88
SERIES IIIC.—								
Pasture after wheat with 1cwt. super .	0.85	1.29	2.09	3.60	5.47	3.42	4.09	2.97
SERIES IIID.—								
Pasture after wheat with 2cwts. super .	1.55	0.99	2.46	3.79	5.31	3.65	4.09	3.12
SERIES IIIE.—								
Pasture after wheat with 3cwts. super .	1.24	0.71	2.32	4.49	5.77	3.39	3.38	3.04
SERIES IVC.—								
Peas with 1cwt. super	2.15	1.59	2.14	5.39	5.74	2.57	2.85	3.20
SERIES IVD.—								
Rape with 1cwt. super	1.59	1.41	2.16	6.48	2.05	1.52	3.62	2.69
SERIES VIA.—								
Pasture after barley with 2cwts. super .	1.23	1.27	1.78	2.53	4.01	3.17	2.31	2.33
SERIES VIB.—								
Pasture after oats with 2cwts. super .	1.46	1.47	1.81	3.95	3.96	2.08	3.43	2.59
SERIES VII.—								Means, three years' period
Lucerne sown with wheat and 2cwts. super, 1916 crop (Plot 42)	1.49	2.06	1.52	—	—	—	—	1.69
1917 crop (Plot 46)	—	1.05	1.28	5.80	—	—	—	2.71
1918 crop (Plot 45)	—	—	1.38	4.63	7.57	—	—	4.53
1919 crop (Plot 44)	—	—	—	3.09	4.46	3.15	—	3.57
1920 crop (Plot 43)	—	—	—	—	6.79	2.61	3.49	4.30
1921 crop (Plot 42)	—	—	—	—	—	2.09	3.49	—
1922 crop (Plot 46)	—	—	—	—	—	—	2.00	—

SERIES VIII.— Rye grass sown with wheat and 2cwts. super—	1917.	1918.	1919.	1920.	1921.	1922.	1923.	Means. two years' period.
1915 crop (Plot 48)	0.97	—	—	—	—	—	—	—
1916 crop (Plot 47)	2.20	1.30	—	—	—	—	—	1.75
1917 crop (Plot 50)	—	2.53	2.35	—	—	—	—	2.44
1918 crop (Plot 49)	—	—	1.77	6.29	—	—	—	4.03
1919 crop (Plot 48)	—	—	—	4.85	6.29	—	—	5.57
1920 crop (Plot 47)	—	—	—	—	4.80	3.19	—	4.0
1921 crop (Plot 50)	—	—	—	—	—	2.12	2.69	2.41
1922 crop (Plot 49)	—	—	—	—	—	—	4.20	—

CALF REARING.

[By P. H. SUTER, Dairy Expert.]

The feeding and rearing of dairy calves means much to the future success in dairyng. Should the calves be denied sufficient nutriment, their future usefulness as producers is considerably impaired. On the other hand, it is a mistake to permit the calf intended for dairy purposes to run with its dam. Naturally the calf develops rapidly; but, unfortunately, such a system tends to promote beef tendencies rather than dairy qualities, and the cow's milking capabilities are spoilt. Far too many of the calves reared on the average farm are constitutionally ruined during the first fortnight of life; they are invariably weaned of milk too early.

The foremost consideration of the dairyman is to keep the calf in a good thrifty condition and prevent any possibility of its losing calf flesh. Any check in a calf's early life is detrimental to its future existence. We are quite familiar with such cases, brought about by wrong feeding or an animal loosing flesh due to scours. If calves are not kept growing well, it is impossible to build good producing cows from them. There is no other animal called upon to produce so much food yearly; consequently, calves should receive the care and attention necessary to fulfil these requirements.

TREATMENT OF COWS.

It is of the utmost importance that the cows should be kept in good condition and allowed at least from six to eight weeks rest from the time of drying off until calving. This rest given to the cow not only allows the cow a chance to recover from the drain upon her system during the milking season, but enables the calf to receive its full supply of nutriment, which it would be denied if the cows were low in condition, and if a shorter rest were given. It is a great mistake to allow cows to become low in condition just prior to calving. Probably the calf will not suffer so much; the ill-effects will lie in the drain upon the cow during her subsequent lactation period. The heavy drain upon the cow during her milking period must not be forgotten; a cow yielding 600galls. of milk with 4 per cent. butter fat produces not less than 780lbs. of solid matter yearly. This is considerably more than the total matter obtained in the weight of a four-year-old beef animal.

Providing the cow has ample feed, &c., very little attention is required, except probably that it is wise to give her a drench of ¾lb. to 1lb. of salts with ½lb. treacle and ½oz. ground gentian, and 1oz. ginger in a couple of quarts of lukewarm water about twice during the two weeks preceding calving.

CALF AT BIRTH.

The best time to remove a calf from its mother is a matter of opinion. Personally, I favor 24 hours after birth, for by this time the calf has been licked dry by its mother, and is firmly established on its feet. Some favor leaving it longer, whereas others remove it immediately it

is dropped. There is no denying the fact that a calf derives benefit from remaining with its mother for two or three days; yet it is questionable if the benefit for the calf compensates for the fretting of the cow when the youngster is removed. The cow's maternal instincts have developed for its young, consequently trouble may be experienced in milking, due to her withdrawing the flow of milk. This is more noticeable with cows on their first calf. The calf removed at this stage is, as a rule, harder to teach to drink.

Immediately the calf is born it is wise to tie the naval cord 2in. from the belly, with a piece of tape, which has been saturated in some disinfectant. Then cut the naval cord half an inch below the knot, and apply cologian Stockholm tar to it. This lessens the danger of introducing germs into the system.

Feeding the Calf.

In Nature, the calf gets its milk often, in small quantities, and at blood temperature, and it should be the aim of dairymen to imitate Nature as far as possible. The first milk secreted by the cow is termed "colostrum." Colostrum contains practically five times as much albumenoid matter and nearly twice as much mineral matter as does normal milk. Further, the albumenoid matter, instead of mainly being in the form of casein, is chiefly in the form of albumen (white of egg), and will not curdle in the calf's stomach. In the event of the death of the cow, probably the best substitute for its milk will consist of one egg beaten up to half a pint of water, half teaspoonful of castor oil, with one pint of whole milk stirred in for each meal. As a food substance, colostrum has a purgative effect on the youngster, cleaning the offensive matter from the intestines and leaving them in healthy working order. Generally, the milk reaches its normal condition after the fifth day, although occasionally eight to eleven will elapse before it has reached its normal stage. The proportion of solids in the milk during the first stages is very high.

If the calf is denied the first milk of its mother costiveness generally results, followed by diarrhoea. In some instances, where calves are removed from their mothers at birth, especially where two or more are born about the same time, the colostrum is pooled and fed to all the calves. If calves are fed on normal milk in the early stages of life, the acid secretions on the lining membrane of the intestines cause the milk to coagulate and separate into two parts, the curd remaining as a foreign or irritating substance in the intestines and the fluid or whey passes off in the form of semi-fluid matter. This is the forerunner of scours in calves. It is imperative that the tender stomach of the calf should receive a food of a delicate nature.

Whole Milk Feeding.

The youngster should receive whole milk for at least a fortnight, and receive its daily allowance in three meals at a temperature of 90deg. F. At the end of the second week separated milk, free from froth, may be gradually added, until the ration is entirely of skim milk. Increase the amount of skim milk gradually. If the calves are being fed 12lbs. of whole milk per day, commence by giving 2lbs. of skim milk to 10lbs. of whole milk, and so on until the end of a

fortnight, by which time the substitution has taken place. When skim milk is added to the ration, something must replace the fat extracted in the act of separation.

Methods of Feeding.

For feeding calves, a rubber teat which has a tube attached has been extensively used. With the aid of this, the calf receives its food in a more natural way, and benefits by drinking slowly, thereby causing the saliva to mix more freely with the milk. This method certainly entails more labor and requires more attention to cleanliness of the teats and tubes, as well as extra attention at feeding time, for if the calf has drained the bucket of its milk, and the teat is not removed, the continual sucking by the calf from an empty bucket results in air being sucked into the stomach. For the purpose of feeding calves in this manner, it is necessary to have miniature bails, so that the calves may suck without interference from each other.

Tied-up Calves.

This method, followed by a good number of dairymen, has proved very successful when the calf has clean surroundings and good shed accommodation, and is permitted to have plenty of run. By feeding separately, the feeder is better able to adjust the amount required by each individual calf, and notice any symptoms of sickness. When any number are fed in this fashion, it means a lot of unnecessary trotting about and requires the presence of a feeder for each calf; otherwise the food is bound to be upset.

Trough Feeding.

Probably this method is most commonly employed. Varying numbers of calves are fed at once. In most instances, little attention is paid to their size, &c., once the ration comprises skim milk, consequently it is a case of the stronger calf outclassing the weaker, and a race to feed as fast as possible, and it must be remembered that some calves drink more quickly than others.

It does not require much reasoning to determine that this method cannot possibly secure the same results as where calves are not bumped about, but are allowed to feed in peace.

Separate Buckets and Miniature Bails.

Probably no system of calf feeding answers so well as miniature bails. With these bails it is not necessary to have partitions. It is an advantage to have the top of each batten, which stands upright when the calf is bailed and falls outward in a slanting fashion, slightly longer than the stationary upright. On the top level portion of the bail is attached, by means of an iron pin, a piece of oregon 3in. x 1½in. This piece or oregon extends the full length of the bails, being run through a socket. When the bails are open to receive the head of the calf, the piece of oregon, being pinned to each slanting portion of the bail, projects from the upright at the end the length of one bail. To the timber running parallel to the top portion of the frame is attached a lever; thus, when the calves run into the feeding yard, and being eager for their feed, push their heads through the bails, the lever is

pulled, and the calves are all bailed at one operation. The slanting portion pinned to the continuous batten can be operated independently of the lever; this being an advantage when one or more calves are required to be kept behind after feeding. In front of these bails, and instead of a continuous manger, is affixed a platform about 10in. wide and about 9in. to 12in. from the floor. On this platform is made a hole sufficiently large to hold the bucket for feeding purposes. Calves fed in this fashion, and allowed to remain bailed up for a short period after feeding, are less likely to contract the habit of sucking one another.

Disadvantage of Skim Milk.

There is one disadvantage in feeding skim milk, as compared with allowing calves to suck the cows. This appears, however, only when they are fed in a careless manner, as when they are only fed twice a day, especially in the first stages of life, and then allowed to have all the milk they will drink. They will, under these circumstances, develop into small, pot-bellied yearlings. Over-feeding is undoubtedly one of the most common causes of inferior calves. It is a mistake, because the fat is removed from the milk, or because the calf is not doing well, to give it an extra allowance. Perhaps nothing upsets the digestive organs of the youngsters, especially when young, more quickly than milk fed at incorrect temperatures. The calf is very sensitive to temperature.

The Fifth Week and Onwards.

At the end of the fourth week from birth the youngster should receive an allowance of crushed oats and bran and a small quantity of the best hay or chaff. It is preferable to break down the hardness of the chaff or hay by pouring hot water over it and allowing it to remain for 12 hours before feeding. Coarse food is too indigestible for young calves. Never allow any food to remain in the feeding trough. Should any be left, remove it and feed to the other stock. Food allowed to become semi-decayed often causes the death of the youngsters. After the animals have reached three months of age, they may be given milk that is slightly cooler, but care should be taken always to give it at the same temperature. If the calves are to be fully developed, they should be given milk for at least from four to five and a half months. After the fourth month the daily ration of milk may gradually be reduced, so that by the end of from five to five and a half months the milk is entirely omitted from the ration. At all times the calves should have abundance of pure drinking water.

Often undue loss of fat occurs in separating the milk, the dairyman perhaps being conscious of this leakage. He is, however, quite content to allow it, because he thinks the loss from this source is more than compensated for by the good results secured from it in feeding the calves. But butter fat is rather an expensive item to add to the diet when cheaper substitutes can be obtained. Probably nothing replaces the loss of fat in milk better than ground linseed cooked into porridge, it being highly digestible, and having beneficial effects upon the condition of the organs of digestion. In preparing the gruel or jelly, use 1lb. of linseed to 7lbs. of water. It is noticeable that calves

fed on linseed possess a sleek coat and thrifty appearance. Cod liver oil gives very good results; also copra cake. If serious scouring takes place amongst the calves, it is evident something is wrong with the ration. A dose of 1oz. to 2ozs. of castor oil, followed by 10 drops to 12 drops of laudanum in the afternoon generally corrects the trouble. A pint of linseed water given in the milk twice generally acts as a corrective. Very good results are also obtainable by using a teaspoonful of the following mixture:—15½ozs. of water to ½oz. of formalin. The exclusive feeding of skim milk for any length of time is not advisable. The composition of the food should resemble as near as possible whole milk in its nutritive ratio.

Feeding with Whey.

If cheese is made on the farm, or if the whey is pasteurised at the factory, it can generally be obtained in a fairly sweet condition. Unless pasteurised it should not be fed until at least one hour after being removed from the vat. At the end of this time most of the gas has disappeared. The amount of fat in whey is greater than in skim milk, but it is deficient in protein or curd. The curd is retained in the manufacture of cheese, yet most of the albumen, sugar, and mineral matter is retained in the whey.

It is always advisable to give the youngsters a start on milk diet for a few weeks before substituting whey. Commence by giving milk in the morning and whey in the afternoon. In a very short period they will readily take to it. Never mix whey and milk. Owing to the absence of nitrogenous matter, it is necessary to replace this element; ground oats and linseed jelly will fulfil this deficiency.

Boiled Linseed.

The mode of preparing boiled linseed is:—Soak 2lbs. of ground linseed in 3galls. of water for 6 to 8 hours, and then boil for half an hour. Just before this is done, ½lb. flour, previously made into a paste with cold water, is added. This is mixed at the rate of one part to four parts of milk. Whole linseed contains, roughly, 35 per cent. fat, 22 per cent. protein, whereas most of the meals have the fat extracted.

Cod Liver Oil.

Procure the commercial bran of cod liver oil and give it to the calves during the second and fourth weeks at the rate of 1 dessert spoonful at each meal, and gradually increase the quantity until 2ozs. is given at each meal.

Summary.

The following describes briefly the diet of the calf, although in respect of the quantities quoted it must be remembered that calves of different breeds require different amounts; likewise, individual calves of the same breed vary in their requirements:—

First week.—Its mother's milk three times daily, commencing on 9lbs. daily and increasing by the third day to 10lbs.

Second week.—12lbs. whole milk three times daily.

Third to fourth week.—Commence 2lbs. skim milk and 10lbs. whole milk, until the change from whole to skim has taken place; at the same time gradually increase the quantity to from 14lbs. to 15lbs.

together with one dessert spoonful to 1½ dessert spoonfuls of cod liver oil, or 2ozs. of linseed porridge. Commence giving little crushed grain, &c.

Fifth to ninth week.—Milk, 6lbs. to 18lbs.; linseed, 1 pint; crushed oats, hay, or chaff, and grazing.

Tenth to sixteenth week.—18lbs. to 20lbs. milk; increase quantity of grain and chaff, &c.

Eighteenth to twentieth week.—Gradually wean of milk. Discontinue giving evening milk.

Twentieth to twenty-second week.—Discontinue milk altogether, but gradually and systematically increase the quantity of foods given.

RIVER MURRAY HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1924.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during February.	Per Cow during February.	Per Cow October to February.	Per Herd during February.	Per Cow during February.	Per Cow October to February.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1/C	34·03	32·31	25,585	751·83	4,114·74	949·89	27·91	153·73
1/J	20	16·31	8,439·5	421·98	2,429·73	397·42	19·87	109·26
1/L	20	18·52	10,295	515·77	3,269·77	468·60	23·48	141·79
1/M	22	18·52	9,043	411·04	2,015·60	478·77	21·76	103·60
1/R	18	17·48	6,565·5	364·75	2,626·37	348·96	19·39	124·00
1/T	15	10·31	6,938	462·53	2,415·91	333·49	22·23	120·92
1/W	17·90	14·14	6,249·5	349·13	2,512·56	243·95	13·63	96·96
1/Y	19	16·69	10,653·5	560·71	3,069·99	462·53	24·34	139·67
1/Z	20·66	18·52	9,746	471·73	2,648·44	429·53	20·79	120·35
1/Dd	26·07	21·07	11,840	454·16	2,908·02	496·66	19·05	126·73
1/Ee	11	10·55	6,661	605·55	3,216·20	296·27	26·93	147·44
1/Ff	12	10·24	5,472	456·00	3,413·96	247·92	20·66	142·68
1/Gg	12	10·38	6,101·5	508·46	3,468·86	267·76	22·31	156·48
1/Hh	13	11·41	8,331·5	640·88	3,564·62	389·29	29·95	155·68
1/Ii	13	10·38	6,501·5	500·11	3,032·76	304·48	23·42	131·88
1/Jj	15	12·66	8,588·5	572·57	2,701·54	361·74	24·12	115·60
1/Kk	14	12	8,279·5	591·39	3,196·31	359·07	25·65	139·66
1/Ll	15·1	13·1	8,732	578·27	2,864·98	377·44	25·00	126·63
1/Mm	19 86	18·28	9,890	497·98	2,949·70	487·98	24·57	139·55
Means	17·77	15·41	9,153·29	515·11	2,959·82	405·36	22·81	129·33

GLENCOE HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1924.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during March.	Per Cow during March.	Per Cow October to March.	Per Herd during March.	Per Cow during March.	Per Cow October to March.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
3/A	17	16·97	11269·5	662·91	4923·48	505·48	29·73	205·09
3/B	16	15·61	5625	351·56	2371·02	298·17	18·64	104·83
3/C	12	9·19	4817·5	401·46	4326·60	208·17	17·35	171·85
3/D	11	9	7300·5	663·68	3514·53	279·81	25·44	134·75
3/E	15	11·32	8427·5	561·83	3700·13	374·43	24·96	155·37
3/F	9	8	3952·5	439·18	3892·42	192·62	21·40	157·86
3/G	10·58	9·87	6261	591·77	4275·97	241·86	22·86	160·25
3/H	16	15·23	7589	474·31	3535·30	332·64	20·79	136·23
3/I	14	14	6603	471·64	3591·85	304·59	21·76	150·06
3/J	15	15	5921	394·73	2557·24	291·31	19·42	115·21
3/K	21·84	21·23	10848	496·70	3574·59	499·43	22·87	150·24
3/L	21	19·58	7875	375·00	3225·96	373·97	17·81	131·98
3/M	15·29	13·10	6124·5	388·84	3218·51	275·50	17·49	138·16
3/N	20	17·13	10562·5	528·13	3332·74	514·87	25·74	142·04
3/O	17	15	8897	523·35	3253·45	350·54	20·62	118·38
3/Q	61·29	59·77	26116·5	426·11	3380·97	1090·72	17·80	137·63
3/R	18	18	11361·5	631·19	4184·22	510·04	28·34	178·94
Means	18·24	16·94	8797·14	482·42	3529·22	390·83	21·43	144·67

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MOUNT GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1924.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during March.	Per Cow during March.	Per Cow August to March.	Per Herd during March.	Per Cow during March.	Per Cow August to March.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
2/A	15	15	6866·5	457·77	4202·99	350·91	23·39	170·84
2/B	9	7·19	5591	621·22	6321·05	238·57	26·51	228·89
2/E	12	11·61	7082	590·16	5155·58	319·79	26·65	215·66
2/H	24·97	24·35	12737·5	510·11	5178·27	595·94	23·87	206·08
2/I	14	13·68	7269	519·21	5356·95	323·24	23·09	209·34
2/J	13	13	7951·5	611·65	6654·75	372·92	28·69	268·97
2/K	24·48	21·29	11053	451·5]	4615·54	466·78	19·07	176·46
2/L	23·48	20·06	10565	449·95	3498·96	520·99	22·19	155·90
2/O	31·16	19·90	9762	313·28	3645·76	441·70	14·18	139·81
2/R	16	15·32	12486·5	780·41	7866·50	477·81	29·86	309·32
2/S	6	6	3363·5	560·58	6258·19	162·74	27·12	282·05
2/T	12	12	8447·5	703·96	6179·34	365·79	30·48	233·71
2/U	17	13·58	5151·5	303·03	5880·68	234·08	13·77	230·33
2/V	21	17·10	5654	269·24	3484·16	264·62	12·60	141·39
2/W	16	9·13	5379	336·19	6239·91	232·66	14·54	227·57
2/Y	12	10·90	7328·5	610·71	6013·63	326·09	27·17	241·25
2/Bb	9	8	3425·5	380·61	4305·61	144·82	16·09	164·93
2/Cc	13	11·61	4125·5	317·34	3828·66	194·02	14·92	163·77
Means	16·06	13·87	7457·72	464·35	4985·70	335·19	20·87	195·74

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ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, April 28th, there being present Capt. S. A White (Vice-Chairman), Professor Arthur J. Perkins, Col. C. Rowell, Hon. W. G. Duncan, M.L.C., and Messrs. Geo. Jeffrey, C. J. Tuckwell, J. W. Sandford, H. S. Taylor, P. H. Jones, W. J. Colebatch, H. Wicks, C. A. Loxton, B.V.Sc., A. B. Feuerheerdt, A. M. Dawkins, and F. Coleman. An apology was received from Mr. L. Cowan, B.Sc.

Welcome to New Board Members.—The Acting Chairman (Mr. Geo. Jeffrey) extended a cordial welcome on behalf of the Board to the recently appointed members, Hon. W. G. Duncan, M.L.C., and Messrs. C. A. Loxton, B.V.Sc., and A. B. Feuerheerdt. The Acting Chairman (Mr. Geo. Jeffrey) also said how pleased members were to again have Capt. White with them after his prolonged illness.

The Secretary was instructed to express the thanks of the Board to Sir William Sowden for his kindness in presenting to the Board a number of copies of an article dealing with afforestation for distribution amongst the Branches of the Bureau.

Cream Inspection.—Mr. C. J. Tuckwell referred to cream inspection methods adopted in Canada, and the Secretary was instructed to secure information with respect thereto.

Experimental Plot for Tantanoola.—Dealing with a request from the Tantanoola Branch asking that an expert might be sent to their district to report on the feasibility of utilising water for irrigation purposes, it was decided, on the suggestion of the Director of Agriculture, that the Manager of the Kybybolite Experimental Farm should visit Tantanoola for the purpose of making inquiries in the direction suggested.

Appointment of Life Member.—In response to a suggestion that a former officer should be appointed a life member of the Advisory Board, the Minister of Agriculture stated that he did not think it advisable to make any such appointment.

Horehound.—The Board decided to ask the Government to add "horehound" to the list of proclaimed noxious weeds.

Airless Storage of Fruit.—In commenting on the request of the Blackwood Branch for a report dealing with the "airless" method of storage for fruit, the Horticultural Instructor (Mr. Geo. Quinn) stated that from information that he had been able to gather from the neighboring States the process involved cumbersome and expensive containers, which, in Mr. Quinn's opinion, would place the scheme outside of practical adoption in shipping fruit overseas, even if it proved effective in preserving the fruit. The Secretary was instructed to advise the Blackwood Branch in terms of Mr. Quinn's report.

Horse Judges.—The Lipson Branch asked—"That the Advisory Board be asked to supply a list of prominent horse judges." It was decided that the desired information should be sought from the Clydesdale Horse Society and the Royal Agricultural and Horticultural Society.

Crop Competition, Lameroo.—Mr. P. H. Jones, of Pinnaroo, was deputed to represent the Board at the forthcoming meeting for the distribution of prizes.

Resolutions from Mid-Northern Conference.—The following resolutions were received:—(*a*) That action be taken by the Advisory Board of Agriculture to bring before the Government the necessity for safeguarding farmers against being supplied with cornsacks that are smaller than the Chapman standard, because fully half of the cornsacks in the district this year were 1½in. narrower than the standard"; (*b*) "That this Conference is in favor of the action of the local govenment bodies in their efforts to bring about the repeal of the new Width of Tires Act"; (*c*) "That this Conference urges its members to use their influence against the growing of red wheats".

Destruction of Foxes.—The Mid-Northern Conference resolved—"That in the opinion of this Conference it is desirable that the Advisory Board be asked to urge on the Government the necessity for bringing in legislation to provide for the simultaneous destruction of foxes along similar lines to those adopted for the destruction of rabbits." The Board decided to support the resolution in so far as the destruction of foxes came within county boundaries.

Resolutions from Lower Northern Conference.—The following resolutions were received—"That the Government be asked to compel all landholders to destroy foxes and that the destruction of such be under the supervision of the Minister of Crown Lands, and that a simultaneous destruction be made during the months of February, March, and April, and that the Government be asked to deal with Crown lands, water reserves, and forest reserves"; (*b*) "That the members of this Conference use their influence in the direction of deterring farmers from growing red wheats."

Rural Science Course for Women.—The Riverton Conference carried the following resolution—"That the Women's Branches of the Agricultural Bureau situated in the lower northern areas of the State are very favorably impressed with the advisability of inaugurating a short course of domestic science for rural women on the lines suggested by the Advisory Board of Agriculture, and would ask the Government to give favorable consideration to the proposal." It was decided to transmit the resolution to the Minister of Agriculture for his information.

Separate Congress for Branches interested in Horticulture and Viticulture.—At the Conference of Lower Northern Branches it was decided—"That this Conference recommends that a separate two days' annual Congress be granted to those Branches interested in the viticultural and horticultural industries." A resolution from the Blackwood Branch supporting this request was also received. The

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59, FRANKLIN STREET, ADELAIDE.

Board decided that at the 1924 Congress one session should be devoted to matters dealing with horticultural and viticultural subjects.

Dry-Farming Plough.—Plans of a dry-farming plough were submitted to the Board by Mr. E. E. Craig, of Mile End. The Board decided to ask the Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch) to furnish a report on the practicability of the implement.

Date of May Meeting.—It was decided to hold the next meeting of the Board on May 13th, at 2.30 p.m.

Life Membership.—It was decided to add the name of Mr. J. J. Odgers (Hon. Secretary of the Ramco Branch) to the list of life members of the Agricultural Bureau.

New Branch.—Approval was given for the formation of a Branch of the Agricultural Bureau at Rudall, with the following gentlemen as foundation members:—H. W. Fitzwater, P. J. Smallacombe, G. A., R. W., and J. F. Potter, A. J. Hutchinson, C. T. Brittan, J. R. Smith, J. R. Darby, J. F. and R. R. Crabb, W. C. Hampel, H. W. Watkins, W. F. Wake.

New Members.—The following names were added to the rolls of existing Branches:—Rosedale—J. Partridge; Naracoorte—H. J. H. Pluckhahn, T. E. Ekers; Kangarilla—K. Thorpe, W. Turner, R. Pinder; Murray Bridge—A. B. Bowden; Redhill—W. Guthrie; Balaklava—C. W. Hill, J. Treloar; Clare—J. E. Butler; Kalangadoo (Women's)—Mrs. L. Hill, Miss Hill; Coonalpyn—A. Drummond; Saddleworth—L. Baldwin; Morchard—L. G. Gardiner; Lyndoch—S. Auld; Paskeville—T. H. Perry; Morphett Vale—G. L. Hercock; Warcowie—T. Ryan, jun., P. Shinnick; Nantawarra—A. Greenshields; Yeelanna—S. J. Heard, L. Gentle, H. Bains, B. Skipworth, J. Harsma; Mypolonga—E. J. Petney, P. H. Pickering, G. G. Hall, H. Duell, W. Rhue, A. E. Weidenhoffer, G. H. Weidenhoffer, A. D. Oburn, H. Kleeman; McLaren Flat—P. Kyto, W. Wickham; Arthurton—H. T. Walding, R. Power; Bundaleer Springs—P. Moebus, M. Lammers; Wirrulla—E. H. Lovegrove, C. Lovegrove, A. A. Schar; Mundalla—C. Dinning; Shoal Bay—H. K. Robinson; Mannanarie—H. Jones; Farrell's Flat—V. Gaskill; Strathalbyn—H. Hooper, F. G. Rose, J. Wood; Gladstone—L. G. Stevens; Wynarka—P. B. Rushworth; Mount Schank—E. Pudney, H. Pudney, W. Ashby, Jas. Fox, R. Hasting; Mount Gambier—C. Kentish; Tantanoola—C. C. Nitschke, T. Edgment; Tatiara—W. Butler; Pinnaroo—F. Venning, L. Venning, G. R. J. Venning, G. Tiller; Hartley—C. Cross; Rosedale—L. Heinjus; Salisbury—A. Treloar, L. Treloar, R. Treloar; Parilla—F. Hannan, C. Schumacher, H. Schumacher; Farrell's Flat—G. Miller; Netherton—R. A. Brokensha; Lameroo—J. S. Roberts; McLachlan—B. Dawson, B. West; Mundalla—G. Toll; Redhill—J. Dundor; Light's Pass—P. G. Edwards, A. S. Gillingham; Rockwood—G. D. Mudge, W. G. Mudge, F. A. Mudge, F. Darwin; Talia—J. McNamara; Goode—C. Gene.

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ORCHARD NOTES FOR SOUTHERN DISTRICTS FOR MAY, 1924.

[By C. H. BEAUMONT, Orchard Instructor.]

This month will be one of preparation for winter work; probably the first thing to be attended to will be planting of young trees. It will, of course, depend on the weather; but as soon as the ground will break up nicely, the nurseryman can lift the trees and planting may proceed. Have the land well prepared beforehand, so that all that is necessary is to clean out the holes and get the trees in. Do not plant in land unless it has been sweetened by being fallowed for at least one season. Do not waste time and trees by planting in the scrub. Do not plant deeply; the crown of the tree should not be more than 4in. deep, and the roots should slope downwards to about 7in. or 8in. Fasten the young tree to a stake to help it to get a firm hold. Prune as soon as possible after planting.

Give young citrus trees some water if rain be delayed.

See that ploughs and implements for working the land are in good order and ready for work; harness and chains also need attention.

Get drying trays and picking bags and cases cleaned out and housed away. Spray pumps and fittings need to be thoroughly cleaned before being put away; this applies especially to hoses and nozzles.

Pruning may be commenced; do the stone fruits first, then the grapes, and finish with the apples and pears. Make sure that secateurs and saws are sharp and clean. Prune bearing trees lightly as a general rule; young trees need to be pruned according to the growth, to make a stiff frame.

Plough to the trees as soon as you conveniently can, and leave in the rough, taking care to make ample getaway for flood waters.

Remember that fruit in cool store requires attention and repacking at intervals.

Citrus trees will need watching for "brown rot"; keep the lower limbs well off the ground, and do not allow water to remain about the trees. Straw of any kind serves a good purpose if spread under the tree, by preventing splashing.

THE AGRICULTURAL OUTLOOK.

REPORTS FOR THE MONTH OF APRIL.

The following reports on the general Agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective Managers:—

***Booborowie.*—Weather—The weather for April has been characterised by its coolness, with a fair quantity of useful rain, 176 points having been registered up to the time of writing, making a total of 581 points for the year. Crops—**

A few isolated paddocks that have been sown to oats on stubble land are showing a green tinge. The lucerne fields are producing fair quantities of fodder. Natural feed is plentiful. Stock—All livestock are in good condition. Pests—Nothing worth mentioning as regards pests. Miscellaneous—Seeding will be quite general by the first week in May.

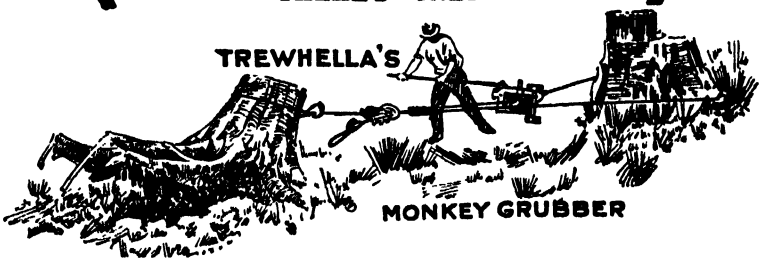
Eyre Peninsula.—Weather—Exceptionally warm weather for this time of the year. There have been 25 points of rain for this month. The present weather promises to lead up to good seeding conditions ere long. Crops—The majority of settlers have commenced seeding in earnest, some having sown considerable areas up to date. New and stubble land is, of course, safe, but fallow is dangerously moist to seed without a good rain. Natural feed has all dried and is of little feeding value. Stock, unless hand fed, are falling away in condition, but seem remarkably healthy, especially horses. Pests—Rabbits are numerous, but settlers are keeping at them with poisoning, &c. Miscellaneous—A number of settlers are water carting, but there is still a good supply in all the Government tanks around these districts.

Turretfield.—Weather—The weather this month has been dull and cool. Many days have started with misty rain, others with heavy dews or frosts. Crops—Grape cutting has been pushed on as quickly as possible, but there still remain many acres unpicked. The cool summer and heavy growth of foliage have made the ripening very late indeed. Natural feed is scarce, except in the hills and where the rainfall was heavier. Stock—Sheep are suffering from the effect of eating stinkwort. Pests—Rabbits are numerous. Miscellaneous—A few farmers have started seeding, but many are holding back on account of the uncertain weather and bad condition of the soil.

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With these men at your disposal you could do quite a lot of clearing. In the **"Monkey" Grubber** you get their strength, without the upkeep, in a simple, compact, easy to-handle form. With the short lever supplied, the power is in your own hands. This sturdy machine is equipped with ropes equal to the heavy demands made on grubbing tackle, and each is fitted with hook and loop couplings—splices and loose pins have been banished. A fast gear and rope shortener help you to get quickly to the actual pull, and an automatic lowering gear allows you to release from a strain. Standard equipment will clear 1½ acres from an anchor.

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DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, reported on May 1st, 1924:—

BUTTER.—As anticipated in our last report, supplies recorded a seasonable shrinkage for all grades, especially choicest qualities, and heavy importations have had to be brought along from the eastern States to supply the trade locally. In the early part of the month several parcels of second and third grade butters were shipped to oversea buyers, but towards the end these grades also decreased in quantities, and are now being absorbed by the local demand. Values have improved considerably, owing to the shortage in local production and importations having to be brought in. Values:—Choicest factory and creamery fresh butter, in bulk, 1s. 6½d.; first grade, bulk, 1s. 3¾d.; second and third grade, bulk, 1s. 1d. to 1s. 1½d.; best separators and dairies, 1s. 4½d. to 1s. 6d.; fair quality, 1s. 3½d. to 1s. 4d.; store and collectors' lines, 1s. 1½d. to 1s. 3½d.

EGGS.—During the last few sales a seasonable shrinkage in supplies has been felt, and buyers have been operating exceptionally briskly for their quantities, values advancing to the prices of fresh hen, 1s. 11d.; duck, 2s. dozen.

CHEESE.—Several fluctuations in values of this commodity have occurred, for although the price was reduced to as low as 7d. per lb., the lessening in quantities coming forward from the South-Eastern factories has improved the local prices, and good clearances have been effected with all coming to hand at the higher rates, namely:—New makes, 9½d. to 11d. per lb. for large to loaf; semi-matured large selling from 10½d. to 11d. per lb., but with fully-matured consignments the demand is rather slow, no doubt due to the heavy stocks which are being held; prices are nominally 11½d. to 1s. per lb.

HONEY.—An excellent trade has been done with local and interstate buyers, although to meet competition a reduction of ½d. per lb. was brought about, so as to retain the New South Wales trade. Values are as follows:—Prime clear extracted in liquid condition, 5d. to 5½d.; best quality candied lots, 4½d.; lower grades, 2½d. to 3d.; beeswax readily saleable 1s. 4d. to 1s. 4½d.

ALMONDS.—Most substantial quantities have been marketed during the month, and with the lack of interstate orders a lowering in values was brought about. However, values are now stationary, and all lots are being cleared at the following rates:—Brandis, 8d. to 8½d.; mixed softshells, 7d. to 7½d.; hardshells, 4d. Kernels short of demand at 1s. 7½d. to 1s. 8d.

BACON.—It is pleasing to report that supplies from local curers have improved, and although a lowering in price was anticipated, this did not come about, on account of the strong demand which is being experienced for all lines of bacon. Several shipments have arrived from Victoria, composed mostly of middles, for which the trade has experienced difficulty in securing their wants. Best factory-cured sides, 1s. 4d.; middles, 1s. 7½d. to 1s. 8d.; rolls, 1s. 3½d. to 1s. 4d.; hams, 1s. 6d. to 1s. 6½d.; Hutton's "Pineapple" brand hams, 1s. 8d. per lb. to 1s. 9d. per lb.; Hutton's "Pineapple" middles, 1s. 7½d. Lard—Hutton's "Pineapple" brand lard, in packets, 1s.; in bulk, 11d.

LIVE POULTRY.—Since the Easter sales farmers have been wisely forwarding their surplus birds, as the supplies have been rather short after the holidays, with the result that values have improved, especially where consignments consisted of prime condition birds. As usual, many lots consisted of birds of light condition; the market absorbed these at fairly satisfactory prices. We advise consigning so as to secure these remunerative rates. Crates forwarded to any address on application. The following rates ruled to-day:—Prime roosters, 5s. to 7s. each; nice-conditioned cockerels, 3s. to 4s. 6d.; poor-conditioned cockerels, 1s. 6d. to 2s. 6d.; plump hens, 3s. 6d. to 5s.; medium hens, 2s. 3d. to 3s. 3d.; light hens, 1s. 10d. to 2s. 2d.; some pens of weedy sorts lower; geese, 5s. to 6s. 9d.; ducks, good condition, 3s. 6d. to 5s. 9d.; ducks, fair condition, 2s. 4d. to 3s. 3d.; turkeys, good to prime condition, 1s. to 1s. 5d. per lb. live weight; turkeys, fair condition, 9d. to 11½d. per lb. live weight; turkeys, fattening sorts, lower; pigeons, 7d. each.

POTATOES.—Prime new Ballarat Carmens, at 8s. to 9s. per cwt., on rail, Mile End.

ONIONS.—Best brown onions, at 8s. 6d. per cwt. on rail.

Over **4,000** Primary Producers,

in addition to **HUNDREDS** of business houses,

have placed their **TAXATION** matters in our hands.

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The first year we supply you with our AUTOMATIC INCOME TAX COMPILER (which carries with it 12 months' FREE SUBSCRIPTION to our TAXPAYERS' INFORMATION AND SERVICE DEPARTMENT) wherein you record your transactions under the different headings as they occur. From these records we compile both your

STATE AND FEDERAL INCOME TAX RETURNS,

check ASSESSMENTS, and so forth, FREE of extra charge.

Price, £2 15s., including Automatic Income Tax Compiler, and 12 months' free subscription to our Taxpayers' Information and Service Department.

Important.—After the first 12 months the same service will be rendered from 10s. 6d. per annum.

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DIRECTORS:

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I. GOLOSKY, A.C.U.A., A.A.I.S. (Late of State Taxation Dept.)

A. SAIDE, A.F.I.A., Secretary (Late of Federal Taxation Dept.).

IMPORTS AND EXPORTS OF FRUIT, PLANTS, ETC., MARCH, 1924.

IMPORTS.

Interstate.

Apples (bushels)	100
Bananas (bushels)	4,959
Passion fruit (bushels)	21
Pears (bushels)	4
Pineapples (bushels)	165
Grapes (bushels)	1
Swedes (packages)	1
Potatoes (bags)	14,760
Onions (bags)	1,592
Bulbs (packages)	21
Plants (packages)	7
Seeds (packages)	25
Wine casks, empty (number)	2,990

Rejected—1bush. apples, 1bush. grapes, 6 second-hand casks, 260 bags potatoes.

Fumigated—22 wine casks.

Overseas.

Federal Quarantine Act.

One thousand five hundred and ninety-six packages seeds, &c.

EXPORTS.

Federal Commerce Act.

Six thousand four hundred and sixty-three packages dried fruit, 93,183 packages fresh fruit, 2 packages honey, 60 packages citrus fruit, 1 package jam, and 3 packages preserved fruit were exported to overseas markets. These were consigned as follows:—

London.

Dried fruit	5,991
Honey	2
Apples	91,939
Pears	740
Grapes	22
Plums	7
Quinces	2

India and East.

Dried fruit	32
Grapes	180
Apples	292
Pears	1

New Zealand.

Dried fruit	440
Citrus fruit	60

Argentine.

Jam	1
Sauce	1
Chutney	1
Pickles	1

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of and to the end of April, 1924, also the average precipitation to the end of April, and the average annual rainfall.

Station.	For April, 1924.	To end April, 1924.	Av'ge To end April.	Av'ge. Annual Rainfall
Far North and Upper North.				
Oodnadatta	0·69	1·43	2·11	4·94
Marree	0·24	1·26	1·84	6·07
Farina	0·40	1·22	2·17	6·66
Copley	0 45	1·26	2·51	8·39
Beltana	0·19	0·71	2·75	8·97
Blinman	0·31	1·23	3·45	12·53
Tarcoola	0·62	2·07	2·20	7·74
Hookina	—	0·86	2·68	13·46
Hawker	0·15	1·10	2·75	12·92
Wilson	0·10	1·65	2·82	12·58
Gordon	0·14	1·91	2·83	11·55
Quorn	0·29	2·09	3·00	14·21
Port Augusta	0·33	3·25	2·63	9·67
Port Augusta West	0 23	2·91	2·50	9·71
Bruce	0·28	2·18	2·53	10·77
Hammond	0·31	2·63	3·05	11·91
Wilmington	1·20	4·34	3·83	18·29
Willowie	0·27	3·03	3·01	12·57
Melrose	1·15	5·28	4·94	23·40
Booleroo Centre	0·46	3·49	3·36	15·65
Port Germein	1·09	3·86	3·08	12·89
Wirrabara	1·05	4·63	3·50	19·78
Appila	0·86	5·81	3·26	15·00
Cradock	0·11	1·26	1·68	11·52
Carrieton	0·39	2·52	2·85	12·90
Johnburg	0·52	2·19	2·44	10·91
Eurelia	0·23	2·09	3·06	13·54
Orroroo	0·31	1·95	3·38	13·73
Nackara	0·13	1·50	3·06	11·99
Black Rock	0·32	2·22	3·10	12·75
Ucolta	0·36	1·71	2·74	12·04
Peterborough	0·66	2·92	3·27	13·53
Yongala	0·93	3·50	3·16	14·58
Lower North-East.				
Yunta	0·03	0·99	2·55	8·88
Waukaringa	—	1·61	2·32	8·54
Mannahill	0·14	0·84	2·60	8·67
Cockburn	0·36	1·75	2·30	8·31
Broken Hill, N.S.W.	0·12	1·35	2·86	9·98
Lower North.				
Port Pirie	1·07	4·42	3·18	13·55
Port Broughton	1·44	4·40	3·08	14·29
Bute	1·81	4·31	3·12	15·78
Laura	1·13	3·63	3·74	18·26
Caltowie	0·99	4·38	3·60	17·20
Jamestown	1·33	5·21	3·52	17·89
Bundaleer W. Wks.	1·58	6·57	3·17	18·09
Gladstone	1·21	6·07	3·42	16·29
Crystal Brook	0·76	6·00	3·32	15·95
Georgetown	1·25	5·97	3·81	18·55
Narridy	0·75	3·86	3·43	16·37
Redhill	1·08	3·83	3·41	16·94
Lower North—*continued.*				
Spalding	1·31	5·45	3·28	20·27
Gulnare	1·60	6·50	3·13	19·36
Yacka	1·97	5·85	2·98	15·48
Koolunga	1·72	4·91	3·21	15·89
Snowtown	1·68	4·44	3·18	16·07
Brinkworth	1·88	4·90	2·82	16·30
Blyth	1·57	6 25	3·45	17·03
Clare	2·42	7·70	3·69	24·68
Mintaro	1·43	5·56	3·93	23·57
Watervale	2·19	7·19	5·19	27·54
Auburn	1·25	4·73	4·87	24·35
Hoyleton	1·16	4·62	3·61	17·91
Balaklava	1·23	4·59	3·52	15·95
Port Wakefield	0·71	4·79	3·39	13·28
Terowie	0·56	2·60	3·21	13·82
Yarcowie	0·81	2·68	3·33	14·22
Hallett	0·81	4·45	3·21	16·49
Mount Bryan	1·11	5·60	3·00	16·81
Burra	0·64	4·60	3·59	18·09
Farrell's Flat	0·96	4·95	3·66	19·00
West of Murray Range.				
Manoora	0·90	4·61	3·49	18·93
Saddleworth	0·44	4·08	4·16	19·78
Marrabel	0·68	4·29	3·89	19·78
Riverton	0·74	4·40	4·30	20·79
Tarlee	0·70	4·20	3·82	17·93
Stockport	1·09	4·38	3·54	16·63
Hamley Bridge	1·09	5·60	3·66	16·59
Kapunda	0·76	5·01	4·23	19·89
Freeling	0·51	3·98	3·79	17·99
Greenock	0·74	4·45	4·22	21·68
Truro	0·80	4·38	4·04	20·20
Stockwell	0·62	4·40	4·09	20·32
Nuriootpa	0·61	3·89	4·10	21·00
Angaston	0·70	4·33	4·32	22·53
Tanunda	0·57	4·34	4·44	22·24
Lyndoch	0·79	4·90	4·14	22·93
Williamstown	0·78	4·29	4·78	27·48
Adelaide Plains				
Mallala	1·16	4·91	3·54	16·72
Roseworthy	0·67	4·40	3·66	17·35
Gawler	0·57	5·50	4·03	19·11
Two Wells	0·85	5·10	3·46	18·88
Virginia	0·69	4·40	3·55	17·32
Smithfield	0·70	5·00	3·29	17·24
Salisbury	1·03	5·15	3·94	18·51
North Adelaide	1·76	8·41	4·32	22·37
Adelaide	1·44	6·86	4·17	21·08
Glenelg	1·06	5·29	3·70	18·45
Brighton	0·94	5·57	4·03	21·37
Mitcham	1·34	6·50	4·49	24·26
Glen Osmond	1·52	6·13	4·82	25·94
Magill	2·23	8·26	3·85	25·35

RAINFALL—*continued.*

Station.	For April, 1924.	To end April, 1924.	Av'ge To end April.	Av'ge Annual Rainfall
Mount Lofty Ranges.				
Teatree Gully.....	1·88	7·55	5·09	27·77
Stirling West	2·79	12·16	8·35	46·82
Uraidla	2·34	10·19	7·74	44·23
Clarendon	1·18	7·33	6·35	33·09
Morphett Vale ...	1·06	7·07	4·65	22·90
Noarlunga	0·85	7·18	4·01	20·41
Willunga	0·47	6·90	4·75	25·99
Aldinga	0·49	5·20	3·91	20·44
Myponga.....	0·85	7·55	4·33	29·80
Normanville	0·50	5·63	3·85	30·70
Yankalilla.....	0·69	6·03	4·35	23·31
Mount Pleasant ..	1·03	4·10	4·86	27·28
Birdwood	1·01	4·41	5·10	29·39
Gumeracha	1·95	6·99	5·75	33·36
Millbrook Reservoir	1·69	7·98	4·78	36·21
Tweedvale	1·46	6·94	5·79	35·65
Woodside	1·33	6·26	5·35	32·20
Ambleside.....	1·30	7·52	5·90	34·82
Nairne	1·24	6·06	5·36	28·44
Mount Barker	1·39	6·59	5·63	31·30
Echunga	1·37	6·98	6·02	33·06
Macclesfield	0·96	5·89	5·59	30·65
Meadows	1·46	9·64	6·61	36·19
Strathalbyn	0·94	5·55	3·93	19·37
Murray Flats and Valley.				
Meningie	1·27	6·68	3·86	18·74
Milang	0·87	4·68	3·37	15·45
Langhorne's Brdg.	0·92	4·78	3·19	14·77
Wellington	0·70	4·59	3·24	14·80
Tailem Bend	0·81	4·96	3·05	14·68
Murray Bridge ...	0·73	3·91	3·34	13·94
Callington	0·70	3·99	3·35	15·49
Mannum	0·71	3·41	2·92	11·66
Palmer	0·56	2·25	3·03	15·46
Sedan	0·07	2·17	2·77	12·27
Swan Reach	—	2·58	2·50	11·06
Blanchetown	0·10	2·44	2·64	10·09
Eudunda.....	0·40	2·94	3·60	17·51
Sutherlands	0·02	2·49	2·19	11·20
Morgan	0·16	2·70	2·18	9·30
Waikerie	0·04	3·36	2·63	9·87
Overland Corner ..	—	2·50	2·87	11·03
Loxton	0·19	3·21	3·13	12·50
Renmark	0·06	2·55	2·78	11·06
Monash	0·16	2·94	—	—
West of Spencer's Gulf.				
Eucla.....	—	1·18	3·12	10·01
White Well.....	0·75	2·73	2·06	9·20
Fowler's Bay	0·17	1·94	2·24	12·14
Penong	0·20	3·51	2·46	12·53
Ceduna	—	2·04	1·80	10·25
Smoky Bay	0·21	1·61	1·90	10·98
Petina	0·23	1·91	2·01	12·95
Streaky Bay.....	0·20	1·81	2·56	18·07

Station.	For April, 1924.	To end April, 1924.	Av'ge To end April.	Av'ge Annual Rainfall
West of Spencer's Gulf—*continued.*				
Talia	0·34	1·94	1·94	15·32
Port Elliston	0·71	2·55	2·42	16·56
Cummins	0·42	1·61	1·91	18·56
Port Lincoln	0·95	2·69	3·39	19·66
Tumby	0·34	1·05	2·45	14·56
Carrow	0·36	1·13	2·79	14·42
Arno Bay	0·39	1·79	2·75	13·06
Cowell	0·72	2·37	3·12	11·63
Minnipa	0·25	2·48	3·14	15·51
Yorke Peninsula.				
Wallaroo	1·58	4·62	3·16	14·15
Kadina	2·54	5·24	3·40	16·02
Moonta	1·98	5·41	3·43	15·35
Green's Plains . ..	1·47	4·40	3·06	15·86
Maitland	1·27	7·62	3·85	20·17
Ardrossan	0·52	3·71	2·96	14·18
Port Victoria	1·03	4·34	3·05	15·50
Curramulka	0·27	4·00	3·41	18·20
Minlaton	0·64	3·50	3·33	17·90
Brentwood	0·39	3·67	2·92	15·83
Stansbury	0·80	3·64	3·26	17·01
Warooka	0·66	3·53	3·03	17·80
Yorketown	0·74	4·01	3·09	17·24
Edithburgh	0·37	3·72	3·31	16·58
South and South-East.				
Cape Borda	1·33	4·37	3·96	25·08
Kingscote	0·32	2·12	3·21	19·04
Penneshaw	1·15	2·95	3·09	19·47
Victor Harbor	0·94	4·45	4·16	21·49
Port Elliot	0·94	4·45	4·03	20·12
Goolwa	0·63	4·23	3·76	17·89
Pinnaroo	0·68	3·66	3·32	15·50
Parilla	0·52	3·24	2·53	14·51
Lameroo	0·78	5·26	3·12	16·32
Parrakie	0·77	4·07	2·47	14·58
Geranium	0·95	4·76	2·88	16·62
Peake	1·11	5·80	3·38	16·73
Cooke's Plains ...	0·85	5·75	3·18	15·14
Coomandook	0·85	5·77	3·13	17·49
Coonalpyn	1·40	6·79	3·44	17·40
Tintinara	1·48	6·40	3·41	18·70
Keith.....	1·22	5·79	3·16	18·22
Bordertown	1·09	6·69	3·78	19·39
Wolseley	1·08	6·23	3·46	18·12
Frances	1·10	5·54	3·70	19·73
Naracoorte	1·04	7·00	4·27	22·25
Penola	1·48	6·49	4·96	26·26
Lucindale	1·83	7·85	4·06	23·00
Kingston.....	1·93	7·01	4·26	24·51
Robe	1·07	5·46	4·26	24·69
Beachport.....	1·04	4·91	4·86	27·20
Millicent	2·77	8·06	5·54	29·39
Kalangadoo	2·38	9·95	4·46	32·47
Mount Gambier ..	2·06	7·97	6·12	31·29

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings	
		May.	June.
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Allandale East	†	23	20
Amyton	*	19	16
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Appila-Yarrowie	*	—	—
Arthurton	1008	—	—
Ashbourne	*	—	—
Balaklava	*	10	14
Balhannah	*	9	6
Barmera	*	19	16
Beetaloo Valley	*	19	16
Belalie North	*	17	14
Berri	†	21	18
Bethel	1002	—	—
Big Swamp	*	—	—
Blackheath	†	16	20
Black Springs	†	13	17
Blackwood	†	19	16
Block E	*	—	—
Blyth	†	3	7
Booleroo Centre	*	16	14
Borrika	*	—	—
Brentwood	1007	15	12
Brinkley	*	17	14
Bundaleer Springs	*	—	—
Bute	*	13	17
Butler	1011	—	—
Calca	*	—	—
Cadell	*	—	—
Canowie Belt	*	—	—
Carrow	*	14	11
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Clare	1007	16	—
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Coomandook	†	14	11
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Currency Creek	†	16	20
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Kanmantoo	*	17	14
Keith	*	—	—
Ki Ki	*	—	—
Kilkerran	†	13	17
Kimba	*	—	—
Kingston-on-Murray	*	—	—
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Koonibba	*	16	13
Koppio	*	19	16
Kringin	*	—	—
Kybybolite	*	15	12
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Maltee	*	16	13
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Meadows	*	14	11
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Milang	†	10	14
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Moorak	*	15	12	Rosy Pine	*	—	—
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Morphett Vale	*	22	19	Salt Creek	*	—	—
Mount Barker	*	14	11	Sandalwood	*	—	—
Mount Bryan	*	—	—	Shoal Bay	‡	13	17
Mount Byran East	*	—	—	Smoky Bay	‡	17	14
Mount Compass	*	—	—	Spalding	*	—	—
Mount Gambier	1016	10	14	Stockport	1007	—	20
Mount Hope	‡	17	14	Streaky Bay	‡		—
Mount Pleasant	‡	—	—	Strathalbyn	*	13	17
Mount Remarkable	*	—	—	Talia	‡	12	14
Mount Schank	†	13	17	Tantanoola	‡	17	14
Mundalla	*	14	11	Taplan	*	13	17
Murray Bridge	‡	—	—	Tarcowie	1002	13	17
Mypolonga	1014	14	11	Tarlee	‡	20	17
Myponga	*	—	—	Tatiara	1015	17	21
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Naracoorte	1016	10	14	Uraidla & Summertown	*	5	2
Narridy	1002	17	21	Veitch	*	—	—
Narrung	*	17	21	Virginia	*	—	—
Neeta	*	—	—	Waikerie	*	—	—
Nelshaby	*	17	14	Wall	*	—	—
Netherton	1014	16	14	Wanbi	*	—	—
New Residence	1014	—	—	Warcowie	*	11	16
North Booborowie	‡	13	17	Watervale	*	—	—
North Bundaleer	*	—	—	Weavers	1008	19	16
Northfield	*	—	—	Wepowie	1001	13	17
Nunkeri and Yurgo	*	4	1	Whyte-Yarcowie	*	—	—
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Orroroo	*	—	—	Williamstown (Women's)	‡	7	4
Owen	1004, 1007	16	13	Williamstown	*	16	13
Parilla	‡	16	13	Willowie	*	14	11
Parilla Well	*	19	16	Wilmington	*	14	11
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Paruna	*	—	—	Winkie	*	—	—
Paskeville	‡	16	13	Wirrabara	*	—	—
Pata	*	—	—	Wirrega	*	—	—
Penola	‡	3	7	Wirrilla	*	17	14
Petina	1011	24	28	Wirrulla	1011	17	14
Pinnaroo	*	10	14	Wolowa	*	—	—
Pompoota	*	14	11	Woodata	*	—	—
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Port Broughton	*	16	14	Wynarka	‡	—	—
Port Elliot	‡	21	18	Yacka	*	13	17
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Ramco	‡	19	16	Yaninee	*	—	—
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Rendelsham	*	14	11	Yorketown	*	—	—
Renmark	†	15	12	Younghusband	*	22	19
Riverton	*	—	—				
Riverton (Women's)	*	—	—				

* No report received during the month of April. ‡ Held over until next month. † Formal.
A.M. Annual Meeting.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

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If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

MORCHARD (Average annual rainfall, 13.50in.).

March 22nd.—Present: 15 members and visitors.

QUESTION BOX.—The meeting took the form of a Question Box and Exhibit Evening. The first question to be considered was, "What is the cause of flag smut in wheat?" This question was well discussed, and the decision arrived at by the majority was that the disease was encouraged by lack of moisture at a certain stage of the growth of the plant. "Can we continue to grow wheat at present prices, under the present high cost of production?" All the members spoke freely for the negative, and said if it were not for side lines, such as sheep and cattle, wheatgrowing would not be a very profitable occupation. "Is the weed 'squash melon' useful for sheep feed?" Mr. H. Kupke said the plant made splendid sheep feed, although there had often been statements to the contrary. Store sheep had been placed in fallow paddocks containing rank growths of the plant, and in several weeks the sheep were in prime condition, the plants having been eaten off to the roots. "The best winter fodder for sheep?" Mr. F. Scriven favored barley, but, owing to the trouble caused in subsequent crops, he had discontinued growing it. Mr. H. Kupke spoke in favor of barley, saying that if proper care was exercised the barley would not spread into other cereal crops. The best plan was to eat it right out. Mr. H. Tilbrook favored a good variety of oats. Oats, although not so quick in getting away as barley, would not be detrimental to a crop of wheat, because they fell before harvest operations. "Whether it would not be better for the farmers to manage their own financial operations, and arrange to dispose of their produce, wheat, wool, &c.?" Members replied in the affirmative, believing that if a competent manager were placed at the head of a live co-operative scheme, farmers would obtain more remunerative prices for their produce. Mr. H. Kupke tabled a fine exhibit of Dunn's Seedling apples and Ponderosa tomatoes.

WEPOWIE, March 18th.—Mr. A. E. Matthews contributed an interesting paper, "English *v.* Australian Methods of Farming." An article dealing with the subject "Red Wheats" was read from the *Journal of Agriculture* by the Hon. Secretary (Mr. W. J. Smith).

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

REDHILL (Average annual rainfall, 16.79in.).

March 18th.—Present: 10 members.

CARE OF HORSES.—In a paper on this subject, Mr. H. J. Crouch said that the humane treatment of animals not only contributed to their comfort, but promoted their physical welfare and enabled the owner to get the largest amount of labor from them. Farm animals, especially horses, belonging to a cruel, solvenly, or miserly farmer were rarely in a condition to perform the most efficient labor. Horses should not be pampered, but they should be made as comfortable as circumstances would permit, and provided with a sufficiency of good quality food

and clean water. The owner should also see that they were not abused by beating. If the horses had not been broken in spirit they would not need whipping. He then emphasised the necessity for breeding from only the best animals. A good discussion followed the reading of the paper.

TARCOWIE (Average annual rainfall, 15½in.).

March 19th.—Present, 16 members.

HARVEST REPORT.—Mr. E. Harvie, in detailing some of the outstanding features of the past harvest, said the 1923-4 season was a good one. The total rainfall was 22½in., of which 16½in. fell at opportune intervals during the growing period. Cool weather was experienced during November, thereby making the conditions ideal for the hay harvest. One hundred and fifty-four acres were reaped from crops sown on fallow land before the first seeding rains fell and returned an average yield of 21bush. to the acre. The remaining portion of the fallow—190 acres—was sown after rain had fallen, and averaged approximately 24bush. Pride of place was gained by "Currawa," which yielded 30bush. to the acre sown after the rain.

NARRIDY, March 1st.—Several subjects of local interest were brought forward for the consideration of members, special attention being given to the matter of the inauguration of crop competitions.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BETHEL.

March 11th.—Present: 13 members.

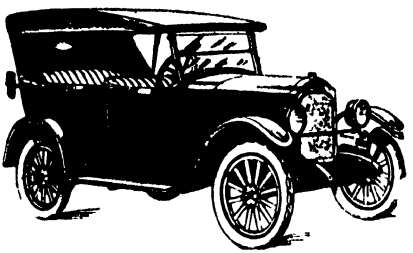
CARE OF FARM MACHINERY.—In a paper on this subject, Mr. S. F. Geue said farm machinery was so expensive that the farmer should take every reasonable care of it. When the harvester or binder had finished work in the field it should be taken to the homestead immediately and placed under cover. Before commencing work in the paddock, each machine should be overhauled, and all worn and broken parts replaced, and oil holes and bearings cleaned out to take the oil. When the binder or harvester was working, every part should be kept well oiled. It was a good plan on rainy days to go over the harvester or binder, and tighten all the bolts and nuts, and ensure that all the parts were in proper working order; that precaution would save hours during the busy time of the year. Special attention should be paid to the pinions; if they were inclined to slip they should not be worked, because they would spoil the crown. When the crops had been reaped, the harvester should be taken into the shed, and a prop placed under the off side of the comb to keep it level. When ploughing or cultivating on hilly land it was preferable to use axle grease instead of oil, because the latter ran out when warm, and did not give the axle the proper lubrication it required. He suggested placing either a piece of bag or tin over the inside of the axle to keep oil from running out, and dust or sand from getting into the axle. Mr. F. H. Geue explained that whenever possible it was a wise procedure to have oil or grease caps placed on the plough or cultivator axle instead of the ordinary pin. That would keep the wheels tight, and prevent the oil and grease from working out. An interesting discussion followed the reading of the paper.

NANTAWARRA (Average annual rainfall, 15.90in.).

March 20th.—Present: eight members.

JOHNSON GRASS.—In the course of a short address dealing with this subject, Mr. R. P. Uppill said he had been growing Johnson grass for three years. Sheep, especially, were fond of the grass, and although it could be grown under a wide variety of conditions, he was of the opinion that best results were obtained from land of a sandy nature. The seed, if sown through the drill at seeding time, would not germinate until October, and the plants would die off at the approach of winter, but a fresh growth would be made during the following summer. Fallowing or discing did not destroy the plants. He thought Johnson grass increased the carrying capacity of sandy land, and thereby added fertility to the soil. About 5lbs. of seed would be sufficient to sow 30 acres.

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OWEN.

March 5th.—Present: seven members.

HARVEST RESULTS.—Mr. W. J. Marshman contributed the following paper on this subject:—"The opening part of the year 1923 was one of the driest experienced in this district for many years; practically no rain fell over the greater part of the surrounding district from January 1st until May 1st. Light rains then fell, and for the first three weeks in May seeding conditions in this district were ideal. Towards the end of the month heavy showers set in and continued through June and July, when we experienced some of the wettest weather known to the oldest residents in the district, consequently seeding operations were seriously delayed, the fallows became quagmires, and those up-to-date farmers who waited for the weeds to grow before seeding were unable to sow a crop, and others were unable to complete the whole of the area intended for sowing. On scores of farms the wheat was simply bogged in. For the greater part of the season, with the exception of about three or four weeks in the spring, the weather continued showery until the end of the year; yet, notwithstanding all the handicaps and the excessive wet season, the harvest results not only came up to expectations, but in the majority of cases exceeded by far the results of previous years. Some of the best averages over large areas of wheat left for the harvester were gathered in, and yields of from 30bush. upwards are reported; frequently in some cases 40bush. and over have been reached. It is noteworthy that year by year our farm averages for grain are steadily on the increase. This fact can be attributed to better methods of cultivation, the sowing of a better class of seed, and the application of heavier dressings of superphosphate. With regard to hay results, this district has cut, not only the heaviest tonnage of hay as a district, but this season we have cut the heaviest tonnage per acre ever cut to date. In the past from 2 tons to 2½ tons per acre was a splendid return; this season has eclipsed all others in that 3-ton crops are by no means uncommon. Good tillage, heavy dressings of seed and super, the growth of more suitable hay varieties, and the abundant rains all contributed their part in making 'harvest results' a new record for the district. In regard to the most suitable varieties of wheat for grain in the surrounding district, on the western side, three varieties in particular appear to stand out very prominently, viz., Early Gluyas, Ford, and Sultan. There can be no question about Early Gluyas being the best all-round wheat in the scrub and light country, notwithstanding its liability to go down very badly. Farmers west of Owen over a number of years have had no wheat to equal, leave alone surpass it, for its ability to withstand drought and to fill the bags. This wheat was selected many years ago by Messrs. Gluyas, of Telowie, from a wheat named Wards. What Federation has done for the farmer in the Wimmera, Victoria, Gluyas has done for the farmer, especially on the lighter soils of South Australia, and not only in South Australia has it become very popular, but it is showing splendid returns in some of the other States. We are indebted very much to the Roseworthy Agricultural College for keeping this variety true to type, for by very careful selection they have been able to keep up the very high yielding qualities of this wheat. Ford has put up some splendid records for the past three years both on the heavier and lighter types of soils. Six years ago I received the first small parcel of Ford from the Roseworthy College, about 5lbs. in all, having seen it in the small plots at the College. In 1918 I stripped the first little plot, which yielded so well that I decided to try it the following year. That year (1919) was very dry towards the close, and many poor crops were harvested in the district. Ford gave per acre 9 bags of beautiful plump grain. The next time I harvested Ford it gave me 10 bags per acre, and since then it has spread all over the district, and has given some very fine yields; indeed, 11 and 12 bags per acre being frequently reported. Ford was bred at the Roseworthy Agricultural College, and is the result of the cross Fan and Comeback and Crossbred 53. Ford is an early mid-season wheat, stands up well, but is a little inclined to shell with very heavy hot winds. Ford is one of the best yielding varieties of wheat that we have. Sultan is a dual purpose wheat bred also at the Roseworthy Agricultural College, and is the result of crossing King's White with Caliph. Caliph is the result of King's White and Marshall's No. 3. This wheat also is a heavy yielder of grain. It is somewhat tough to thresh, and if sown too early in the season is liable to go down. To minimise the danger of going down, and to get better threshing and cleaning results, Sultan

should not be sown early in the season, and the harvesters should be put into it as soon as it is fit to strip. My experience with Sultan has been that though not rustproof, it does not rust so badly as King's White or Red. It is a wheat well worthy of further trial. I wish to make special mention of another variety of wheat, one by no means new, because I can remember it being grown over 30 years ago, and that is Leak's Rust Proof. In the *Journal of Agriculture*, August, 1919, the Manager of the Turretfield Experimental Farm says 'Leak's Rust Proof should be classed with such old and hardy varieties as Gluyas, King's White, King's Red, Federation, and one or two others,' and proceeded to say that it went out of fashion for some reason or other, and is only now coming in again. He says this variety is much too good to be neglected, being both a grain yielder and a really good hay wheat. Acting upon this advice, some three years ago, I procured eight bags of graded seed, and during the past three seasons as a bulk crop it has given me the best returns for grain of any variety I have grown on my farm. It might be classed as a late variety, but I believe it to be the hardiest late wheat I have grown up-to-date; it will stand dry conditions remarkably well, and will make very rapid growth during the spring months. It is a good stooler, does not go down or shed its grain with rough winds. More attention should be paid to this prolific variety. This wheat I believe to have been selected by the late Mr. Leak, of South Australia. King's White, King's Red, Sultan, Baroota Wonder, and Early Zealand Blue occupy, perhaps, the first positions among the early varieties of hay wheats, and Late Zealand Blue and Leak's Rust Proof among the late. Both King's White and King's Red were selected from Mr. Joseph King's King's Early by the Roseworthy Agricultural College. Baroota Wonder is a selection from Ward's Prolific. Unfortunately, some confusion now exists in respect to this wheat. Selection work has been carried out in Western Australia in respect to this wheat, and three so-called strains have been selected, namely, Turvey, Baroota Wonder Early, and Baroota Wonder. Turvey is purple strained, while Baroota Wonder Early and Baroota Wonder are

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BLOOD MANURE
BONE MANURE

both white strained wheats. In my opinion only the one type of this wheat should have been strictly adhered to, and all efforts concentrated towards retaining and improving one particular type as the standard type of Baroota Wonder. Zealand Blue, or what is known as Crossbred 53, is a Western Australian wheat, and we now have the two strains, early and late. Both are very hardy varieties, and stand dry conditions very well, and, under ordinary circumstances, will cut dense crops of hay. The late variety, in particular, is exceptionally sweet in the straw, stock showing a decided preference for it. With regard to Leak's Rust Proof, three years ago, when rust was very bad in this district, and most other varieties were badly discoloured in the straw, Leak's was almost free from rust, and retained its bright green color, making an attractive hay for the chaff merchant. I would strongly advise farmers in hay districts to give this variety a trial." During the discussion which followed, Mr. Bowyer stated that Scotch Grey and Algerian oats had yielded over three tons per acre on stubble ground. Mr. R. S. Harkness stated that Sultan had yielded very satisfactory results for hay and grain. The new wheat Dan averaged 38bush. per acre, and Nabawa gave splendid promise.

SADDLEWORTH WOMEN'S (Average annual rainfall, 19.69in.).

March 18th.

Mrs. Newmann contributed a paper, in which she gave an interesting description of the river settlements from Morgan to Waikerie. Miss Frost also read an instructive paper, "Station Life at 'Warrakoo,' River Murray, New South Wales." Miss Frost exhibited a fine collection of photographs depicting various phases of station life.

TWO WELLS (Average annual rainfall, 16.36in.).

March 29th.—Present: six members.

Care of Woodwork.—Mr. E. J. Wheller contributed a paper on this subject. If a piece of wood, which had been cut across the grain, were examined, he said, it would be noticed that it was more or less porous, according to whether it was a soft or a hard wood. Those pores gave the wood its elasticity, but if they were allowed to become broken down or rotten the wood lost its strength. If the wood were exposed to all weathers, the pores would soon become broken down owing to the continual expansion and contraction of the pores caused by the alternate damp and dry atmosphere. It was therefore necessary to put a covering over the wood to protect it from direct exposure to the atmosphere. Paint was one of the best substances for that purpose, it not only kept out the weather, but prevented the sap or natural moisture in the wood from evaporating. It was necessary, therefore, to ensure that the woodwork was well covered with paint, and all vehicles exposed to the weather should also have a fresh coat every second year at least. That not only prolonged the life of the vehicle, but saved a considerable amount of time lost in screwing up bolts that became loose owing to the breaking down of the pores. In addition, paint also gave the woodwork a pleasing appearance, and he thought it was their duty to make everything on the farm as pleasing to the eye as possible. For the better class of work there were different grades of ready mixed paint and varnishes on the market, but it was not generally known that coal tar could be used to take the place of paint for the rougher class of work, such as gates and vehicles that were used only on the farm. Instead of warming the tar to make it work easily, it could be thinned down to the consistency of paint by the addition of benzine. It could then be applied more easily and quickly, and would dry more quickly than tar in its natural state. By the addition of red oxide the tar could be made a desirable brown color, or a bronze green color could be obtained by the addition of yellow ochre. The outbuildings, such as the cowsheds and bails, pigsties, &c., should be given a coat of whitewash occasionally, both from the point of view of appearance and sanitation. Well slaked lime made one of the best washes for that purpose; 2½lbs. of alum should be dissolved in boiling water and added to a bucketful of whitewash. The mixture should be applied thinly, two coats being required. Many persons used the wash when too thick, and did not add a sufficient quantity of binder, consequently the wash appeared very patchy. Another very good wash was made by mixing cement with fresh separator milk to about the consistency of paint.

CLARE, February 22nd.—A paper, "The History of Viticulture," was read by a member, and an interesting discussion followed.

LIGHT'S PASS, March 20th.—A paper, "Vine Growing," which had been prepared by Mr. S. Ellis, was read by Mr L. Koop. The paper raised several interesting points and a keen discussion resulted.

OWEN, March 25th.—The Hon. Secretary (Mr. R. S. Harkness) read a paper from the *Journal of Agriculture*, "Tillage of the Soil," which aroused an instructive discussion.

STOCKPORT, March 21st.—Fourteen members and visitors attended the March meeting, when Mr. D. L. Stribling, who had recently made a trip to Loxton and Renmark, gave an interesting address, in which he referred to the agricultural and horticultural practices carried out along the river.

YORKE PENINSULA DISTRICT

(TO BUTE)

BRENTWOOD.

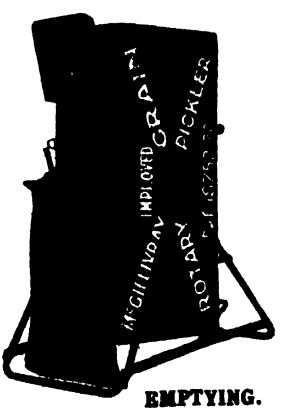
February 28th.—Present: 13 members and five visitors.

HARVEST REPORT.—Mr. J. J. Honner, who read a paper dealing with this subject, first referred to the abnormal weather conditions which prevailed during the past year, and especially during the seeding season, with the result that a large area of the crops were "bogged in"; 18.07 points of rain were received for the 12 months, and Mr. Honner considered that an annual precipitation of 12in. at favorable intervals would have given, generally, better results. For the district he estimated the average yields to be 21bush. per acre for wheat, 18bush. per acre barley, 27bush. per acre for oats. Hay yield—wheat on fallow, 2 tons per

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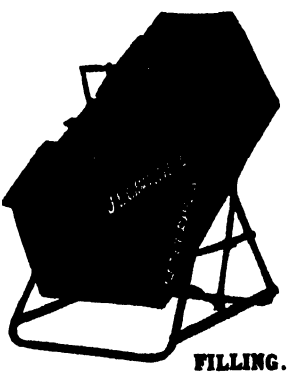


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acre; oats, 2 tons per acre; oats on stubble, 1½ tons. The grain sample was irregular, many varieties of wheat which in normal years produced good, sound, plump grain yielded pinched and light grain, which weighed in the vicinity of 150lbs. to the bag. Generally speaking, the sample was free from smut and foreign seeds. Barley, although of a superior quality to previous years, contained a considerable amount of oats, mustard, cockspur, which, no doubt, was due to the difficulty experienced in dealing with weeds, owing to unfavorable cultivating conditions. Most of the prime barley was ruined through being threshed too closely. The oat sample was only fair, containing large quantities of barley. In some instances farmers were guilty of marketing grain in old corn sacks. That was false economy, because any losses caused through broken bags, &c., reverted to the producer. "Currawa" Mr. Honner considered to hold pride of place as regards the best varieties of wheat for the district, with "Ford," "Nugget," "Major," and "Queen Fan," following in the order named. In the course of the discussion which ensued, Messrs. R. G. Anderson and A. E. Twartz said farmers should be compelled to use sound corn sacks, because all the producers would have to suffer through the fault of a few. Mr. F. L. Carmichael thought the skinning, or close reaping of the barley was due to the exceptional weather conditions, the grain was soft, and great difficulty was experienced in reaping it without doing any damage to the grain. Mr. R. Anderson advocated opening the machines and using fewer sieves in the harvesting machinery to remedy the close reaping. Mr. A. E. Twartz agreed, and said barley was not blown out of the machines, but carried over because the sieves became overcrowded.

WEAVERS.

March 10th.—Present: 10 members.

DESTRUCTION OF FOXES.—Mr. W. Anderson read the following paper:—"Of all the pests with which the farmer in this district is troubled at the present time, the fox is undoubtedly the worst. The fox is useful in that it kills rabbits and mice in the paddocks, but the damage that it does in other ways more than counteracts any good that can be claimed. Poultry, unless always securely enclosed, will be taken by the fox; but the damage that this pest does during lambing season is very severe. Each fox, on an average, kills a lamb a night, and perhaps more than that. The weaker the ewe the more liable it is to lose its lamb. It is of no use poisoning a lamb after a fox has killed it, while there are plenty of live ones about. The best plan is to distribute the poison before the lambs come. Drag a trail just after sun down, and lay poisoned baits such as birds or pieces of liver. If farmers organised during March, and did all they could to destroy foxes by poisoning and other means, such as fumigating and filling in the holes, there would be a better percentage of lambs than at present. At the present price of sheep it would pay to raise a fund and pay scalp money for a month, and so induce others to destroy the foxes. Every fox killed would mean many more lambs."

ARTHURTON, March 19th.—Fourteen members and several visitors were present at the March meeting when local topics, including the Maitland Conference, crop competitions, &c., were brought forward for discussion.

WESTERN DISTRICT.

POOCHERA.

March 1st.—Present: 15 members and three visitors.

DESTRUCTION OF RABBITS.—Mr. M. Prowett read the following paper:—"The destruction of rabbits should be looked upon as one of the important jobs on the farm, and when the time is opportune, other work should be laid aside, and no efforts spared to destroy the vermin. Many farmers make no attempt to deal with the rabbits until after seeding, depending upon either bisulphide of carbon or traps to eradicate the pest. For pastoral purposes or where the country is over-run with rabbits, the poison cart is very useful, especially in certain seasons and under certain conditions. In a season with a dry summer, when there is no green feed in the fields, the poison cart, if used after the first rain, will kill a very large proportion of the rabbits, especially if showery weather

continues for a day or two afterwards, the rain keeping the poison soft and making the rabbits hungry. Under average conditions, however, I prefer the heaping up or mounding of the burrows, which should be done when the ground is quite dry, so that the earth will run freely. This work is more easily done and more successful where the ground is of a sandy nature, but may be done quite successfully in fairly heavy loam, too, if a little care is taken to break the lumps and get the finest dirt available, that which the rabbits have scratched out of the holes being excellent for the purpose. It is necessary, or at least advisable, to go around all the burrows again the second or third day, and repeat the work on any holes that have been reopened. On a farm where the rabbits have been kept within bounds, this mounding should not occupy more than a couple of days at the most, and very few rabbits will be left. Then, after seeding, the first thing to do is to go around all the cropped land and ascertain where there are still odd rabbits. These may be caught with a dozen or so spring traps.''

In the discussion that followed, Mr. A. Milman considered the best way to get rid of rabbits was to wire net an area and kill the rabbits inside by filling in the burrows and distributing poison. Mr. V. Newbon considered filling in the burrows on a large holding would occupy too much of the settler's time. Mr. Prowett explained that a single-furrow plough would be a great advantage and save a lot of time in filling in the burrows. Mr. W. Gosling thought open bush country was only a breeding ground for rabbits, and should be cleared and ploughed as soon as possible. Mr. S. Joy had obtained good results from raspberry jam and oats treated with strychnine, together with filling in the burrows.

TAKE-ALL.—The following paper was read by the Hon. Secretary (Mr. S. Joy):—''Take-all is a fungus which is to be found in almost all of the light soils on the West Coast, and, in fact, nearly all over South Australia, and if the cultivation given the soil is favorable for the increase or spread of the fungus, the third year's crop will, as a rule, show signs of take-all. The disease seldom appears on fallowed land, even though the fallow has received no other working than that

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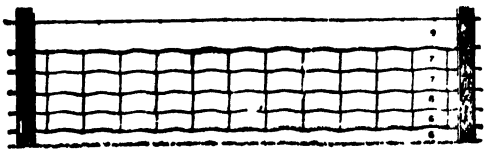


Fig. 7—Cyclone Special Spring Coil Sheep Fence.

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with the plough at fallowing time. The fact that take-all is most severe in light soils would appear to point to the fact that there is something in the way of plant food contained in heavy soils which is absent in lighter soils. Therefore, it is necessary to work the land by fallowing and cultivation to try and produce the necessary plant food to prevent the growth or spread of the take-all fungus. For that purpose, I prefer to plough in as much green grass or rubbish as possible while the ground shows no sign of take-all. To accomplish this it is necessary to give the grass eight or ten weeks' growth before starting fallowing, and then work the harrows as soon as possible. With that end in view, warm weather should be chosen for the work, because the plants not covered by the plough and disturbed by the harrow would soon die off. To minimise take-all, farmers should endeavor to keep the fallow free from barley grass, if two or three crops are to be grown before fallowing again. Of course, there is the rotation method of cropping, but that is beyond most of the farmers who have a limited area of land to work, and limited capital to spend in clearing land. Again, heavier dressings of super are too expensive, and, after all, it is only a check to the disease. If either of these two methods is adopted, the farmers will be no further advanced than by fallowing, and the extra working of the land will more than compensate for the labor by the heavier return received, and without any extra expense regarding super. The fact that take-all does not affect oats is no proof that this crop kills take-all, and if barley grass is thick in the oat crop it is certain that take-all will be prevalent. Where there is barley grass there is take-all, and the land requires frequent fallowing and cultivating to keep the disease in check. If the land has shown signs of take-all, it is advisable to burn the stubble as soon as possible so as to destroy the food which it is living upon, for take-all will live and increase rapidly if affected stubble or grass is ploughed in, and will probably cause heavy losses in the following crop. Burning would only apply where take-all has made an appearance, for on land free from take-all there are many advantages to be gained by ploughing in stubble or grass. I advise burning and fallowing land that has shown signs of take-all, and it is a mistake to burn and plough and sow a crop during the same year. I would suggest one year of fallow on affected land." An interesting discussion followed. The meeting then took the form of a "Free Parliament," when several other subjects were introduced for the consideration of members.

ROBERTS AND VERRAN.

February 21st.—Present: six members and visitors.

BURNING.—Mr. S. Simmons read the following paper:—"If we consider for a while the advantages to be gained by a good burn, both scrub and stubble, it will readily be seen that it is essential, and more especially on farms such as we have in this district. Scrub should be rolled as soon as possible after seeding, then left until the middle of February, so that the shoots will receive another check by the fire, thereby giving the crop a better chance. Great care should be exercised in burning grass or stubble paddocks, especially if they are joined by grass or stubble paddocks belonging to a neighbor. Every farmer should minimise the risk of fires getting out of control by making fire-breaks around the paddocks at fallowing time. For stubble it is advisable when haymaking to cut a strip around each paddock, thus eliminating the difficulty of ploughing through straw. For light stubble, which will not run a fire, the fire-rake should be used. When this is necessary, every advantage should be taken of good days, because the success of the following crop depends very largely on a good burn. The best results are obtained by working across the wind; for example, if the wind is blowing from the north, to work east and west is the better way. By this method the heat of the fire will not appreciably affect the horses or driver." In the discussion that followed, Mr. H. Simmons favored burning as early as possible. He thought it a good plan to plough the ashes in, because they added to the fertility of the soil. Mr. C. Masters said fire not only killed shoots, but also checked the spread of "take-all." He favored burning scrub as early as possible to avoid the risk of the timber becoming too wet. Mr. F. Masters said a good fire tended to check "take-all." He did not favor burning on clear land, because he did not think the increase in wheat would compensate for the loss of feed. He thought scrub should be rolled before harvest, because the fire

checked the growth of shoots to a greater extent after they had shot from the stumps than was the case if the scrub was rolled just before the fire. Mr. B. Evans said that if scrub was rolled about 18 months prior to burning a greater percentage of stumps was killed, although, as a rule, it did not make such a clean job of the sticks as would be the case if burnt earlier. He favored fire-raking with the wind blowing at an angle. He did not believe in burning grass on clear land.

YEELANNA.

March 22nd.—Present: 13 members.

CARE OF HORSES.—Mr. L. Gentle, who arrived 12 months ago from England, read the following paper:—"Although tractors are the boom of to day, it will be a long time before the horse is displaced on the farm. To obtain the best work from the horses they should be well cared for and studied. The stable should be kept clean and well drained, each horse having a separate stall where it can be tied up whilst feeding, except at night, when it is advisable for it to be loose. To prevent sore shoulders, a horse should have a well-fitting collar, which should be brushed or scraped once a week. The animals should be groomed daily. This, I believe, refreshes them, and prevents sores. During seeding and fallowing, feeding the horses four times a day—morning, mid-day, sundown, and 10 p.m.—on hay chaff and a handful or so of oats, keeps them in good condition. The water supply should be about 20 chains away from the stable. I am in favor of watering the horses at dinner time. Last, but not least, do not drive a working horse in the buggy." In the discussion that followed, Mr. J. Wagner said time spent in grooming horses was time well spent, because it not only refreshed them but also helped to keep them in good condition. Mr. A. Skipworth thought that where a man had about 20 horses to groom, it would not pay to waste time grooming them. Mr. F. Roediger said he did not believe in giving horses too much oats, because the oaten chaff in that district had a good deal of grain in it.

FOX DESTRUCTION.—Mr. A. Skipworth proposed that members of this Branch start to poison foxes the first week in April. All members agreed to the proposal. Mr. J. Lawrence said he had been poisoning foxes for two years, and had secured good results with sparrows treated with soda and poison as baits. He poisoned 30 foxes last year with the sparrow bait.

BUTLER, March 17th.—Mr. C. F. Jericho gave a report of the results of the Government experimental plots conducted under his supervision at Butler. The subject, "The Tod River Water Scheme," was also brought before the meeting.

LIPSON, February 15th.—Several subjects of timely interest were brought before the meeting, and a keen discussion ensued.

PETINA, February 23rd.—A discussion took place on the proposed crop-growing competitions. The price of seed wheat was also discussed by those present.

WIRRULLA, March 15th.—Mr. F. A. Doley read a paper, "Experiences with Underground Tanks," and a keen discussion followed.

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EASTERN DISTRICT.

COONALPYN (Average annual rainfall, 17.49in.

February 22nd.—Present: eight members and two visitors.

COVERING STACKS.—Mr. F. Pitman contributed an interesting paper on this subject. The writer favored iron sheds. They lasted well, and provided catchment for a great amount of water. An interesting discussion followed. The consensus of opinion was that it was desirable to erect a shed to cover 30-40 tons of hay, and to thatch the remainder, the idea being to cut from the shed in wet weather, thus saving time during busy periods. Mr. J. J. Angel then gave a short address on "Burning." He favored burning as late as possible, preferably during March or later. During the discussion, several interesting points were brought forward. Mr. Cronin favored an early burn—January, or even earlier, if possible—contending that the longer the period between the time of burn and the winter rains the greater the check on the shoots. Mr. Pitman favored burning as late as possible, and recommended running the harrows over the ground as soon after the fire as convenient, thereby helping to keep down the tendency of the ashes to drift.

LONE GUM AND MONASH.

January 16th.—Present: 25 members.

RAISIN DRYING.—Mr. H. Berriman contributed a paper on this subject. When selecting the ground, the first thought would be the dry block, he said, but unless that was composed of fairly heavy, hard land, and was comparatively free from dust, it would be a mistake to place the racks there. So far as the actual drying was concerned, dust was the greatest nuisance they had to contend with, and there was usually plenty of that on the dry block after one had been over it a few times with a horse and cart. He had his racks on the dry block, but if he had to build them again, and had a lucerne plot on the irrigated block, he would place his racks there. Another evil which it was well to avoid was having the drying ground too near a road over which much traffic passed. If one had no alternative but to build the racks on the dry block, he thought it would be advisable to have the dip on the western corner of the northern end of the racks, so that it could be approached from the west. In the drying season most of the wind came from either due west, south-west, or from the north, and with the dip placed in that position most of the dust raised whilst carting in would blow away from the racks. In the past, the man with the poor sample got almost as much for his fruit as the man with the good sample, but under the new method of grading those who were careless in drying would pay for their neglect, and only those who produced the best sample would receive the best price. During recent years quite a number of innovations had come into being in the way of alterations, or improvements, in drying racks. He thought, however, most of those had been brought in with a view to economy rather than to an improvement in the quality of the finished article. He was speaking of racks with a greater number of tiers than the majority of racks in that district and elsewhere. He agreed that a rack of that kind was economical in the way of timber and iron, but whether that economy was realised in actual practice he was not prepared to say. He thought, however, that fruit on a rack of that kind would take longer to dry than if it were on a rack with a lesser number of tiers. He thought, too, that, owing to the longer period required for drying, it would militate against quality, and, further, in a bad season the losses would be greater than on the more open rack. The rack he favored was one constructed with five tiers of 4ft. netting, the tiers being 13in. apart. It was immaterial whether the rack was fixed or movable, unless it was required to stack sweats under during the winter when he would prefer to have it movable. *Picking.*—There were various methods of picking fruit. Some fruitgrowers picked direct into the dipping tins in order to prevent further handling, and others into kerosene tins, and others again into small picking boxes. Which of those was the best method he was not prepared to say. The majority of growers, probably not in Berri, but elsewhere, picked into dipping tins. That method certainly saved a lot of time and also reduced considerably the quantity of loose berries, and was very economical. Picking into boxes or kerosene tins meant emptying the fruit into dipping tins at the dip, and besides adding considerably to the number of loose

berries that method meant keeping another man at the dip. Picking into kerosene tins and emptying into dipping tins at the dip might improve the grade, but he would not guarantee that. He had always been used to picking into dipping tins, but he intended trying both this year, and if the grades came out the same he would have no hesitation in saying that picking direct into the dipping tin was the better method. Because a number of loose berries fell during the process of picking it was necessary to have something under the vines to catch them. Last year he had two galvanized trays made, measuring 4ft. by 2ft. by 2in. deep. Those answered the purpose satisfactorily, but a 3ft. by 2ft. tray with a cleat nailed on each side and a piece of tin around each corner would serve the purpose. He always had the tins put out in the middle of the rows, two rows in one, and went up the next row and had the tins handed over the trellis when loading, because if the cart were taken up the same row as the tins they would necessarily have to be pushed under the rows, and sometimes some of them were missed. It was not advisable to commence picking too early, because much weight would be lost in that way. *Dipping.*—The usual strength of the dip for sultanas was about 1lb. of caustic soda to 25galls. of water. That varied according to the toughness of the skin, which in turn was governed by the weather conditions. Possibly, as the season advanced and the skin became tougher the dip would need to be stronger, but 25 to 1 was a good guide to begin with, and could be weakened or strengthened according to the effect it was having on the grapes. Gordos could be commenced at double that strength. The temperature of the dip should be at boiling, or as near thereto as possible. *Cracking.*—So long as one could see any cracks, no matter how small, around the end of the grape which was attached to the stem, one could rest assured that the dip was strong enough. If any other part of the grape were being cut too much, the dip needed weakening. *Spreading.*—That should be done as evenly as possible, one bunch thick, and any bunches that were too large or too thick should be broken up. Rubbing off should not be attempted until the grapes were nearly dry. If it were carried out too soon, the skin would break and the fruit would become sugary and sticky, and spoil the sample. He did not believe in leaving the fruit on the rack until fully dried, because he thought a day or two on hessian evened up the color and improved the grade. Also, he did not think it advisable to have the hessians more than 9ft. or 10ft. long, because, if longer they would contain

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too much fruit and were difficult to handle. Quality should be their slogan in future, and that could only be attained by careful handling and thorough drying. Care should be taken to ensure that the fruit was thoroughly dried before delivery to the packing shed. Currants should be picked into kerosene tins, because if they were picked in dipping tins one usually got a quantity of sand mixed in with them. Currants should not be spread too thickly, though they could be spread a little more thickly than sultanas. In order to procure the best results, side curtains should be put on the racks immediately and kept there until the currants were ready to put on hessian. That helped to darken any red berries and evened up the grade.

MYPOLONGA, March 17th.—To an audience of 14 members and a large number of visitors, the Assistant Dairy Expert (Mr. H. J. Apps) delivered an address. "Important Points of the Dairying Industry." At the conclusion of the address Mr. Apps replied to many questions.

NETHERTON, March 14th.—The members present discussed the different varieties of wheat grown in the district during the past season and the yields received from them. Two bags of Caliph were grown alongside the Viking and Budds varieties under the same conditions, but very little difference was noted until they were reaped, when Caliph averaged about 4bush. more than the other varieties. Some of the members thought that wheat yielded better because it was new, and they were in favor of changing the seed every year or so.

NEW RESIDENCE, March 19th.—The subject for the evening was a paper, "The Drill and Cultivator *v.* the Combine," written by Mr. E. Schober. Nine members were present and all took part in the keen discussion which ensued.

SOUTH AND HILLS DISTRICT.

RAPID BAY.

March 14th.—Present: 21 members.

ROTATION OF CROPS.—The following paper was contributed by Mr. J. D. Lawless:—"New land should first be made free from all bushes and stumps during autumn or late summer, so that a good burn can be effected and the ground ploughed to a depth of from 2in. to 3in. The land should be allowed to remain as bare fallow until the following season, when two crops of wheat can be successfully grown in rotation, providing the second crop has a dressing of about 20lbs. extra manure per acre. The best wheat to grow in this district is Marshall's No. 3 and Crossbred, both being good hay wheats. Oats should be the third crop, and after being harvested the stubble should be burnt during March, in order to kill the young stinkwort and sweeten the ground and free it from take-all. Barley should be the next crop, sown on well-worked soil the first or second week in August." The stubble should be fed to lambs, and they would do remarkably well, providing a small convenient enclosure was provided, and the lambs were fed at night on a ration of about ½lb. of oats to each. If peas were grown the following year, such a crop would put the ground in good heart for wheat again. Half the pea crop should be harvested, and the peas kept on hand for the spring. The remaining portion of the field could be fed to pigs or sheep. "I prefer white peas in preference to the grey varieties. Garden vegetables should also be grown in rotation. Potatoes should not be grown more than twice in succession in the same plot, and if turnips are sown two crops could be grown in one year. I recommend White Duck clover as the best crop to grow on potato land. If the clover is ploughed in the ground in its green stage, potatoes will grow remarkably well, because it has a similar action to a heavy dressing of manure." An instructive discussion followed.

CHERRY GARDENS, March 18th.—The March meeting took the form of an "Exhibit Evening." An excellent display of fruit, including apples, pears, &c., vegetables, fodder crops, cut flowers, and useful articles for the homestead were tabled by members. Each member made a short explanation of his exhibit, which resulted in a very interesting meeting. Thirteen members and nine visitors, including a number of ladies, attended the meeting.

CYGNET RIVER, March 18th.—Mr. L. H. Moar read extracts from an article, "Chemistry of the Garden," which brought forward an interesting discussion. Several subjects of local importance were also considered by members.

McLAREN FLAT, February 21st.—At the monthly meeting of the Branch, held on February 21st, the Viticultural Instructor (Mr. D. G. Quinn) delivered an address, "Downy Mildew," to an attendance of 45 members and six visitors.

SOUTH-EAST DISTRICT.

KALANGADOO WOMEN'S (Average annual rainfall, 33in. to 34in.).

March 8th.—Present: eight members and visitors.

QUESTION BOX. The meeting held took the form of a Question Box. Mrs Campbell asked for a good flavoring for rhubarb. Mrs. Tucker had found essence of almonds most suitable, and a small quantity of lemon juice added to rhubarb was a decided improvement. Miss Tucker asked what caused cakes to rise in the middle and crack when baked. Miss Hemmings thought that mixing the ingredients too stiffly would probably be the reason. Miss Tucker said that a teaspoonful of olive oil added to any kind of cake helped to make it richer. Mrs. Evans said that when making plum pudding she always added a fair-sized carrot, which helped to make the pudding richer, and fewer eggs were required. If fairly strong tea were used for mixing, instead of milk, the pudding would be much darker and of a better flavor.

TATIARA (Average annual rainfall, 19in.)

March 15th.—Present: 11 members and two visitors.

SUMMER FODDER CROPS.—Mr. H. T. Exton contributed the following paper on this subject:—"The thorough preparation of the soil before sowing is a most important factor in the growing of a successful summer crop. The most suitable class of soil is a good loam. Sandy soil—unless too poor—will grow payable crops, while clayey soil is the least suitable, and should be avoided if possible. The land should be ploughed as soon as possible after the seeding is completed, and worked as often as possible to kill weeds and form a good seed bed. It should be ploughed, cultivated, and harrowed down before the seed is sown. Unless the season is very favorable, ploughing the land immediately before sowing does not usually result in a successful crop. If possible have the seed bed firm underneath, and fine and loose on the surface. Sudan grass, which I consider the most reliable plant for summer growing, will not stand frost when young, and does not make much headway until the ground begins to get warm, so it should not be sown too early—about the middle of October is early enough—and good crops might be obtained by sowing as late as the end of November if the land is in good order and sufficient rain falls to germinate the seed. For a fair germination, 5lbs. or 6lbs. of seed per acre is sufficient. The seed should be mixed thoroughly with the super and sown through an ordinary seed drill. Level the mixture in the drill at intervals to ensure even sowing. If the ground is dry, sow as shallowly as possible, but if there is sufficient moisture within a couple of inches of the surface to germinate the seed it may be sown at that depth, unless rain is threatening, when it is best to sow shallow, because if the surface cakes before the plant gets through it may have difficulty in forcing a way through. Light drill harrows attached to the drill are suitable to cover the seed, but, if possible, drill and cover the seed in one operation, because by so doing less moisture is allowed to escape from the soil. Sudan grass is a good fodder for sheep, cattle, and horses, and in my experience is not poisonous at any stage of growth. It may be cut and fed green, or grazed. If intended as a grazing crop, stock should be turned on when the plants are about 15in. high, or as soon as the seed heads appear. If the stalks are too old stock will not eat them. Do not feed down too hard, because the crop will then make new growth, in fact, if not allowed to seed, it continues to grow right up till the cold weather sets in. This plant stands dry weather well and responds rapidly to any summer rains. Do not sow rape and Sudan grass together, or, if rape is sown, use very little, because if much comes up and the season is favorable, it will considerably check the Sudan grass. Japanese millet is also a good summer fodder, especially

for dairy cows, but in my opinion it does not give the same bulk of feed, and after being fed down does not come again so well as Sudan grass. At different times I have had experience with several varieties of millet, but Japanese appears to be the best. During the growing period it requires the same treatment as Sudan grass, the same quantity of seed per acre should also be sown. An acre or two of thousand-headed kale, situated near the homestead, is very useful for feeding to the cows, pigs, and poultry. It gives the best results if sown in rows about 3ft. apart, or wide enough to work a horse hoe or garden cultivator between. If a hand sower is not available, the seed may be mixed with super and sown through an ordinary seed drill. A piece of board should be fixed each side of every fifth star, in order to keep the super and seed from entering the tubes where not required. If sown in drills very little seed will be required to sow an acre. If the plants come up too thickly, thin them out as they grow to about 15in. apart, or even more, if the plants are large. Autumn is the best time to sow, but if sown in the early spring on well-prepared land, and the soil between the rows is stirred whenever it shows signs of setting, a good crop may be obtained The crop can be grazed, but far more feed will be obtained, and the plants will last longer, if the leaves are pulled from the bottom of the plant and the crown is not allowed to become damaged. In a hot, dry summer kale is liable to be attacked by blight. Rape is a useful summer fodder for sheep, and is very fattening, but being liable to the attacks of blight, is rather an unreliable plant. It is said by experts to improve the land on which it is grown. Dwarf Essex is the variety usually grown. This year we tried a small plot of 'Giant Kangaroo,' but whatever it may do when sown in the autumn, there appears to be no difference between it and Essex during the summer. The seed should be sown as shallow as possible on a fine seed bed. For a summer crop 2½lbs., or even less, of seed per acre should be ample, because if the plants are too close they do not stand the dry weather so well. A little white mustard seed sown with the rape lessens the risk of bloat. Mix the seed with the super and do not leave more in the drill over night than can be helped, because the acid in the super weakens the germinating power of the seed. Stock may be turned on seven or eight weeks after the crop comes up, or when the largest leaves begin to turn purple. If care is taken not to overstock, and the crowns are not damaged, the plants will continue to grow for a long time, provided occasional showers fall and no blight affects the plants. If a mixture is desired, a small quantity of Sudan grass may be sown with the rape. Sheep do not take to rape at first, but very gradually become used to it. When first putting stock on any of the above crops, care should be taken to ensure that they are not empty, or that the crop is not wet. If the stock eat the fodder ravenously, leave them on for one hour only twice a day till they become used to it. It is better to be careful than sorry. If possible have two plots, because there is less waste than if stock are allowed to roam over a large area, that also allows one plot to be spelled occasionally.'' During the discussion which followed, Mr. J. Elliot said he had tried Sudan grass, he fed it off five times, and then made hay of it, but the stock would not eat it. Mr. R. Wiese advocated smaller paddocks and summer crops followed by cereals. There was no reason why they should not receive two crops annually. He had 700 sheep doing well on 60 acres of Sudan grass and 20 acres of rape. Mr. H. T. Exton did not think a summer crop would be an advantage to the following cereal crop.

FRANCES, March 29th.—The Chairman (Mr. P. Pfitzner) read an article ''Rinderpest'' from the *Journal of Agriculture*, and an interesting discussion ensued.

MOUNT GAMBIER, March 8th.—A discussion took place on the value of subterranean clover as a fodder for the South-East, and the President (Mr. A. Sassanowsky) read an article from the *Journal of Agriculture* dealing with subterranean clover.

NARACOORTE, February 9th.—Mr. W. E. Rogers read a paper, ''Wells, Dams, and Bores,'' and an interesting discussion followed. During that portion of the meeting devoted to general business, Mr. Turnbull stated that an effective remedy for ants was to pour bisulphide of carbon in the holes inhabited by the insects. For cleaning cut glass and silverware a little petrol rubbed over with a clean rag and dried with another rag was an excellent recipe.

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

No. 11. JUNE 16, 1924. VOL. XXVII.

Published Monthly by the Department of Agriculture.

Edited by H. J. FINNIS

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All communications to be addressed:
"The Editor, Journal of Agriculture, Victoria Square, Adelaide."

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T. BUTTERFIELD,

Minister of Agriculture.

POINTS FOR PRODUCERS.

An Improved Pasteurizer.

The first enamelled, glass-lined pasteurizer installed in South Australia, which is in operation at Messrs. Taylor Bros. butter factory at Gawler, was inspected by the Assistant Dairy Expert of the Department of Agriculture (Mr. H. J. Apps) recently. This pasteurizer has a capacity of 1,000galls., and measures over all, approximately 15ft. x 6ft. x 6ft. It is fitted with all the latest improvements, including twin delivery coils, insulation, and ball bearings. After his inspection, Mr. Apps remarked that from a cursory examination this plant seemed infinitely superior to the wood or lined machine, and its substantial nature should make a strong appeal to manufacturers of butter. Apart from its durability, the machine appeared to be easy to clean, to render the control of temperatures less difficult, and to insure immunity from metallic troubles.

Rations for Pigs.

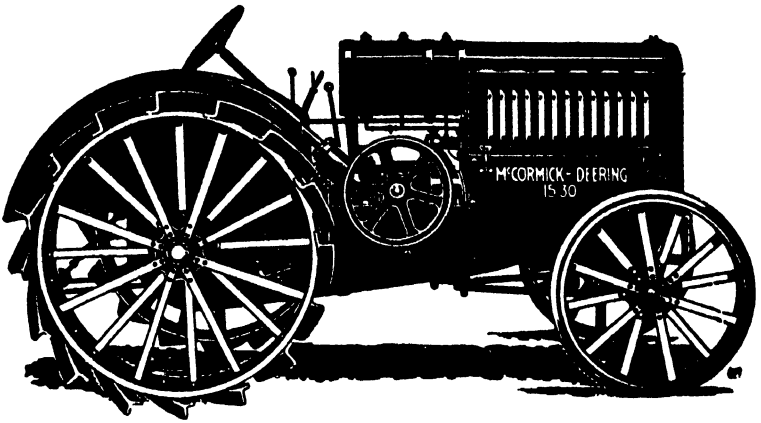
As daily rations for fattening pigs, the following have been prepared by the Director of Agriculture (Professor A. J. Perkins) for the guidance of a firm of pig raisers in the Hills District:—

	Porkers. (80lbs.) lbs.	Light. Baconers. (150lbs.) lbs.	Heavy Baconers. (200lbs.) lbs.
1. Crushed wheat	3½	5½	6¾
2. Crushed wheat	2	4	5
Pollard	2	2	2¼
3. Crushed barley	1½	2	3
Pollard	3	5	5¼
4. Crushed barley	2	4	5
Crushed peas	2	2¼	2¾
5. Crushed oats	2	4½	6
Crushed peas	1¼	1¾	2
6 Crushed barley	3	5	6
Separated milk	7	12	14

The figures are not absolute, and must be varied according to requirements of animals; they offer, however, a definite indication as to the proportions in which the various foodstuffs should be supplied to fattening animals.

Journals Wanted.

In the New York Public Library there is a set of volumes of the *Journal of Agriculture* complete except for the following numbers:— Volume 4, No. 2, September, 1900; Volume 4, No. 6, January, 1901; Volume 4, No. 8, March, 1901; Volume 5, No. 7. February, 1902; Volume 8, No. 1, August, 1904; Volume 8, No. 6, January, 1905; Volume 9, No. 1, August, 1905; Volume 9, No. 10, May, 1906; Volume 9, No. 12, July, 1906; Volume 10, No. 1, August, 1906;



McCormick-Deering Tractors.

THE McCormick-Deering Tractor is well adapted to farm work. It is equipped with a vertical 4-cylinder valve-in-head engine, which operates economically on kerosene and other low-priced fuels. The cylinders are cast separately and fitted into the engine block, so that they may be easily removed and replaced in case they become scored or worn. The Tractor is equipped with high tension magneto, with impulse starter, has a throttle governor, and the principal bearings throughout the entire machine are roller and ball. A belt pulley of large diameter on the right side of the machine is conveniently placed for belt work, and can be started or stopped from the driver's seat, independent of the engine. Three forward speeds, 2, 3, and 4 miles an hour, and reverse.

TWO SIZES: 10-20 and 15-30.

See the **IHC** local agent or write direct to us for Illustrated Pamphlet.

International Harvester Company of Australia, Pty., Ltd.,

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Agents Everywhere.

Volume 10, No. 2, September, 1906; Volume 10, No. 6, January, 1907; Volume 10, No. 12, July, 1907; Volume 11, No. 2, September, 1907; Volume 12, No. 1, August, 1908; Volume 12, No. 6, January, 1909; Volume 12, No. 9, April, 1909; Volume 13, No. 3, October, 1909; Volume 13, No. 6, January, 1910; Volume 13, No. 12, July, 1910; Volume 15, No. 5, December, 1911; Volume 15, No. 6, January, 1912; Volume 15, No. 9, April, 1912; Volume 16, No. 4, November, 1912; Volume 19, No. 9, April, 1916; Volume 20, No. 2, September, 1916.

The director of that library wishes to make the set complete. Unfortunately, the Department of Agriculture is not able to supply the missing numbers, but readers who have kept their *Journals* may have one or more of these numbers for which they have little use. Any such copies forwarded to the Editor, *Journal of Agriculture*, Adelaide, would be thankfully received.

PROTEIN CONTENT OF BARLEYS.

A request from the Tarlee Branch of the Agricultural Bureau for information as to the protein contents of Cape and Malting barley, lead to analyses being made at the Roseworthy Agricultural College of barley grown at that institution. The State Agricultural Chemist (Mr. A. T. Jefferis, B.Sc.) gives the following results:—

	Protein. Per cent.
Malting—	
Prior	12.3
Duckbill	13.2
Cape—	
Roseworthy Oregon	12.8
Shorthead	12.8

There appears to be more proteins in South Australian than in European, but much the same as in Queensland, as the following figures show:—

England, 2 rowed, av. of 6 varieties	9.7
Denmark, 6 rowed, av. early and late sown	11.6
England, 6 rowed, av. 4 varieties	9.0
Queensland barley	12.4

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Replies supplied by MR. ALAN H. ROBIN, B.V.Sc., Veterinary Officer, Stock and Brands Department.]

Agricultural Bureau, Meadows, asks the reason why several pigs of a litter have been born without a manure passage.

Reply—Absence of the anus, as sometimes happens in young pigs, is a congenital defect. Sometimes only the very end of the bowel is imperforated, and at other times the bowel for some little distance in from the anus is also closed. Operation is the only resource, and in many instances, providing it is carried out early, results are satisfactory. If it is only a membrane of skin closing over the anus (when dung may usually be felt lying up against it) this layer of skin is simply grasped with the forceps and cut through with scissors. Reunion of the edges may be prevented by smearing the parts with a little bland ointment. In blockage of the passage for some way in, the trouble is more difficult to correct, and the adhesions must be broken down with care until the open passage is reached. It is really a case for an experienced skilful operator. The bowel must be smeared with oil to prevent adhesions recurring for a few days Soapy warm enemas help the bowels to act and keep the passage clear.

"J. A. L.," Abbeville, asks is there any method of mixing salt and sulphur to make a solid lick for horses.

Reply—This could be effected by mixing together the required ingredients in powdered form until they are thoroughly and evenly mixed together. This powder can then be made up into solid form by adding some mucilage of acacia and enough water to mix. Shape it into blocks and put it aside to dry hard.

Agricultural Bureau, Brinkworth, reports horse has lost one eye, the eyelids are swollen, and the eye is continually weeping.

Reply—Bathe the eye externally with a little warm boracic lotion, then instil into the eye a few drops of the following lotion:—Zinc sulphate, 2 drams; boracic acid, 1 dram; distilled water, 1 pint. This treatment should be repeated at least twice daily and ought to prove beneficial, although most probably the only permanent cure for the condition would be surgical attention. Keep the eye clean by the above treatment and flies will not be so troublesome.

Hon. Secretary, Agricultural Bureau, North Booborowie, asks cure for swamp cancer.

Reply—"Swamp cancer" does not exist in South Australia. If you will supply particulars of the trouble, we might be able to diagnose same and suggest a suitable treatment.

"B. G. L.," Cannawigara, reports horse 11 years old has bad cough, with nasal discharge; losing condition rapidly.

Reply—Give the horse a good physicing to commence with. Have the following physic ball made and given:—Aloes barb., 5 drams; calomel, 1 dram; powdered nux vomica, 1 dram. This should work in 16 hours to 24 hours after giving it and during the time it is working give the horse only bran mashes and green feed and take the chill off the water. Should the physic ball not work too well, a pint of raw linseed oil may be given two or three days after the ball. After the physic commences to work, and subsequently until the horse shows improved appetite, give the following powder quarter hour to half hour before each feed:—Powdered nux vomica, 1 dram; powdered gentian radix, 3 drams. You should get a supply of these powders made up, and to give them, mix the dose with a tablespoonful of treacle or molasses to make a stiff, sticky paste. Pick this up on one end of a flat piece of stick, and opening the horse's mouth with the other hand, smear it over the back teeth and tongue so that it sticks there and the animal has to lick it down.

Hon. Secretary, Agricultural Bureau, Marama, asks treatment for horse passing white worms.

Reply—Injections of salt solution per rectum will destroy any within the latter portions of the bowel, as they frequently are. Starving the horse for 24 hours and dosing with raw linseed oil, 1 pint, turpentine, 2ozs., will prove effective.

Agricultural Bureau, Wynarka, asks can a horse be cured of lockjaw and, if so, what is the treatment.

Reply—Many cases are on record of recoveries from lockjaw affecting horses The general lines of treatment are as follows:—Place the affected animal in a darkened stall, without bedding and far away from other animals so that he may be in the quietest possible circumstances. The attendant must be very quiet and careful in handling him and avoiding undue noise or excitement. Do not rattle tins or buckets about or shout out to the horse. Exciting or disturbing the animal only brings on an increase of the spasms. Give the horse an early dose of aloes, 6 drams to 8 drams, conjoined with 2 drams of belladonna extract. Give as a ball. If the animal's jaws are clenched and he cannot swallow, medicine cannot be given by the mouth and recourse must be had to hypodermic syringe. If possible, put 1 dram of belladonna extract every four hours to six hours on his back teeth so that he can lick it down. Clothe the neck and upper parts of the body in woollen blankets kept saturated with very warm water, keeping this treatment up for six hours to eight hours at a time. This has a beneficial action in combating spasm and pain accompanying it, and must be repeated as frequently as necessary. Keep water in front of him always, raised up so he can get it without undue effort. If he can feed, give sloppy feed, green feed, oatmeal gruel. If the infection is through a traceable wound, this wound must be thoroughly cleaned out and disinfected with carbolic acid or corrosive sublimate. Recovery without treatment would be very rare. Sometimes it has been said that this has happened, but to the untrained eye other conditions of disease might be mistaken for tetanus.

RATION FOR WORKING HORSE.

"I have just finished taking off a good crop of maize and also have left a fair amount of small cobs on the stalks, this I am going to cut and stack. I would like to know if, after putting it through the chaff cutter, I can feed it to my horse. I propose giving it in a proportion of half maize chaff with half lucerne chaff and a small jam tin of crushed oats, four kerosene tins or more per day." This extract, from a letter written by a soldier settler on the Chaffey Irrigation Area, who points out that he is anxious to reduce his chaff bill, but at the same time without in any way reducing the efficiency of his horse through incorrect feeding, was forwarded to the Superintendent of Experimental Work (Mr. W. J. Spafford) for an expression of opinion. He replied as follows:—

You are very wise to endeavor to reduce your chaff bill as much as possible; but, unfortunately, the material at your disposal is not too good for the purpose. Using Kellner's method of valuing foodstuffs ("The Scientific Feeding of Animals," by O. Kellner), in which all feeds are brought to one muscle and

POWER FARMING

The Question of the Hour.

A further list of questions put to us by farmers is given below, together with our replies.

Question—*Why is tractor farming cheaper than farming with horses?*

Answer Tractor farming is considerably cheaper than with horses, especially when we consider the many advantages it offers, namely:—

Timeliness, cheaper work, increased farming capacity, belt work, and release of land for profitable stock raising and other purposes. It is a means to better and larger yields per acre. Low cost of doing farm work is obtained with the use of the CASE tractor, because of the vast amount of power under the control of one man.

Question—*Will the CASE tractor enable me to do better ploughing?*

Answer With the tractor you can do better ploughing because you can regulate the depth of ploughing to the needs of your soil. You can regulate your speed to the ploughing conditions and can maintain the most effective speed at all times. You can rush the work, if necessary, to avoid bad weather, or to take advantage of a few good days in a bad or late season.

The tractor is a willing, tireless servant, and works steadily just so long as someone will drive it.

PROOF POSITIVE

Of the adaptability and dependability of the

CASE

Kerosene Farm & General Purpose Tractor

Read this letter from a satisfied CASE owner:

"I am thoroughly satisfied with the CASE 15/27, as I have disposed of my horses, and have done all the field work on a 600 acre farm of heavy soil for approximately 12 months. I have put the Tractor at all classes of work, and it is quite up to my expectations.

I consider the greatest advantage of the Tractor is that it permits of a greater amount of work being done at the most opportune time.

My experience has been that the 15/27 CASE will satisfactorily and economically pull on top gear any implement requiring 12 good horses to do so, and have reserve power to take care of a larger load temporarily, as is required here to get out of some of the dips in the ground surface.

The services rendered by Messrs. C.A.S.E. Ltd., is all that it should be. The promises made of mechanical services to be rendered are proficiently fulfilled."

Included among the innumerable unsolicited testimonials we have received from CASE Tractor users all over Australia, may possibly be the experiences of farmers who have had to contend with conditions similar to those on your farm to-day. You can get the benefit of these experiences from our Book of Testimonials, Post Free on Application.

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POWER FARMING

The Question of the Hour.

Question—*Why does the tractor furnish more suitable power for all drawbar operations?*

Answer Because it has the power and speed required to do the best grade of work. It is capable of pulling a number of implements in combination. Because the CASE has the necessary pulling power the various implements can be set or adjusted to be most effective.

Question—*Then the CASE is a durable product, a safe investment?*

Answer Farmers throughout Australia now realise that the CASE Kerosene Farm and General Purpose Tractor is practically everlasting; there is no such thing as depreciation of usefulness. It is as lasting as its massive one-piece frame, because when parts wear, by reason of long service, every item is quickly and cheaply replaceable. Even cylinders can be renewed by fitting new barrels without taking out the engine. Farmers know, from the experiences of hundreds of CASE tractor users that the CASE is a safe investment.

Question—*I would like to see a CASE tractor at work. Where can I do this?*

Answer We shall be pleased to give you the names and addresses of CASE tractor owners in your district, also copies of unsolicited testimonials from hundreds of farmers who use the CASE tractor if you will drop a line to—

Commonwealth Agricultural Service Engineers, Ltd.,
RICHARDS BUILDINGS, CURRIE STREET, ADELAIDE.



"That's the reason—the CASE!"

Here is an actual experience of neighboring farmers during last harvest in South Australia—crops were divided only by a fence!

ONE FARMER depended upon horses, and fearing that delay would mean late sowing, he got on to the land before it was in a fit condition for the drill.
Result: Harvest below average—SEVEN BAGS.

THE OTHER FARMER, a CASE Tractor owner, knowing that he could speed up and accomplish his sowing in a short time, waited until conditions were favorable.
Result: Crop above average—THIRTEEN BAGS.

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The CASE Tractor is the ideal power in all emergencies, and the best form of crop insurance. It gives the Farmer absolute control over his operations, enabling him to do all his work in the shortest time. Use a CASE in every operation this year, and get the best result from your labor.

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fat-producing value, and expressed as "starch equivalents," shows your suggested mixture of equal quantities of lucerne chaff, chaffed maize stalks, and a little crushed oats to be unsuitable for a working horse, and to explain this, the following figures and statements are necessary:—

1. All values put on the various ingredients in the foodstuffs by Kellner have been derived from actual feeding tests, and apply to materials of good quality.

2. The feeding value of the foodstuffs mentioned, and of linseed cake, are as follows:—

Digestible Nutrients.

Foodstuff	Dry Matter. Per cent.	Protein. Per cent.	Fat. Per cent	Carbo Hydrates. Per cent.	Fibre. Per cent.	Starch Equivalent. Lbs. per 100
Linseed cake	89.0	28.8	7.9	25.4	4.3	71.8
Crushed oats	86.7	8.0	4.0	44.8	2.6	59.7
Lucerne hay	83.8	10.9	1.1	19.1	12.2	24.5
Maize stalks	85.0	1.7	0.5	17.2	23.5	20.3

3. A draught horse weighing 1,400lbs. and doing medium work requires daily in the feed supplied—34lbs. dry matter, 16.24lbs. starch equivalent, and not less than 2.24lbs. of digestible protein.

4. From the table of feeding values set out above it can be shown that the proposed mixture of equal quantities of lucerne chaff and chaffed maize stalks, together with 3lbs. crushed oats per day, does not fulfil the requirements of a working horse, and this is set out below:-

Feeds in Ration.	Dry Matter Lbs	Starch Equivalent. Lbs.	Digestible Protein. Lbs.
3lbs. crushed oats	2.6	1.79	0.24
19lbs. lucerne chaff	15.9	4.65	2.07
19lbs. chaffed maize stalks	16.1	3.86	0.32
Totals for daily ration	34.6	10.30	2.63
Required daily by 1,400lb. horse	34.0	16.24	2.24

The above ration, supplied in sufficient quantity to give the required amount of dry matter, also supplies sufficient digestible protein, but falls much below the necessary starch equivalent, and as such is by no means a suitable ration for a working horse.

5. With the three feeding stuffs available, it is extremely difficult to produce a ration keeping to the two main requirements of dry matter and starch equivalent, and it can only be done by reducing the amount of chaffed maize stalks to a very small daily allowance.

6. The chaffed maize stalks can be made to occupy an important part of the daily ration by the addition of a small quantity of linseed cake, as is to be seen below:—

Feeds in Ration.	Dry Matter. Lbs.	Starch Equivalent. Lbs.	Digestible Protein. Lbs.
12lbs. crushed oats	10.4	7.16	0.96
5lbs. linseed cake	4.4	3.59	1.44
12lbs. lucerne chaff	10.0	2.94	1.31
12lbs. chaffed maize stalks	10.2	2.44	0.20
Totals for daily ration	35.0	15.13	3.91
Required daily by 1,400lb. horse	34.0	16.24	at least 2.24

This ration provides the necessary dry matter and starch equivalents, and although more than the required amount of digestible protein is supplied, it can be utilised by the animal.

EUCALYPTUS ASH AS A FERTILISER.

Proposing to use it as a fertiliser on light sandy land, deficient in lime, the Cygnet River Branch of the Agricultural Bureau forwarded a sample of the ash produced from distilled eucalyptus leaf. The sample was submitted to the Director of Chemistry (Dr. W. A. Hargreaves), who states that it contained 26.8 per cent. of coarse material (unburnt twigs and lumps of soil), which was separated from the fine material by passing the sample through a 25-mesh sieve. The fine material contained 28.3 per cent. of lime (CaO) and 7.8 per cent. of water soluble potash (K_2O), and the original sample contained 20.7 per cent. of lime (CaO) and 5.7 per cent. of water soluble potash (K_2O). The Director of Agriculture (Professor Arthur J. Perkins) commented that he has no doubt that these ashes could be used with advantage in the circumstances referred to.

SORGHUM FOR DAIRY CATTLE.

To the Kringin Branch of the Agricultural Bureau, who sought advice as to the means of securing the highest possible returns from a small plot of sorghum to be cut and fed to dairy cattle, the Director of Agriculture (Professor Arthur J. Perkins) tendered the following advice:—"In the circumstances, very thorough winter cultivation is recommended; that is to say, the land should be broken up early, say in July if at all possible, and, if available, a dressing of 15 to 20 tons of stable manure per acre should be ploughed in. The land should be left in a more or less rough state until, say, the end of August or beginning of September, when it should be cultivated down and gradually worked up into a good seed-bed. It is unwise to sow the sorghum too early, because of its inability to germinate in a satisfactory manner until the soil is sufficiently warm for the purpose. Sorghum could probably be sown towards the end of September or during the month of October; it could, indeed, be sown very much later providing a thunderstorm fell to bring about germination, or artificial irrigation can be applied.

"Sorghum should be sown at the rate of 7lbs. to 10lbs. of seed to the acre, thoroughly mixed, by hand, with finely ground bonedust, say about ½cwt. to 1cwt. to the acre. This mixture of bonedust and sorghum seed should be put into a drill and drilled in every fourth drill opening; that is to say, leaving a space of 28in. to 32in. between the rows. It is a good practice to run a light roller over the plot immediately after seeding. When the ground is warm and sufficiently moist, germination should take place at an early date.

"The land should be horse-hoed between the rows from time to time, and, of course, if water is available, it can be irrigated with advantage. The crop should not be cut for feeding purposes until the flower panicle shows well above the crop."

GYPSUM AND ITS USES.

To a correspondent at Poochera the following information has been supplied by the Director of Agriculture (Professor A. J. Perkins):—

Gypsum is applied to soils for specific purposes, and its indiscriminate use cannot be recommended. The following are the chief purposes which gypsum is supposed to meet:—

(*a*) Soil barren from presence of sodium carbonate (black alkali of the Americans) is often treated with gypsum prior to leaching operations. The quantity used depends upon the amount of sodium carbonate present.

(*b*) Gypsum is sometimes used to improve the mechanical condition of stiff clays. Like burnt lime, it helps to open out heavy clay and checks a tendency to cake. One to two tons to the acre would be required, according to circumstances.

(*c*) Gypsum is sometimes used as an indirect manure to liberate potash locked up in the soil. It is used at the rate of 5cwts. to 10cwts. to the acre. It is not of much advantage to wheat crops.

AN UNDESIRABLE WEED.

Tantanoola Agricultural Bureau forwarded a plant for identification.

The Consulting Botanist (Professor T. G. B. Osborn, M.Sc.) has identified this plant as Bartsia viscosa (*Scrophulariaceae*), a Mediterranean weed, recorded as a naturalised alien in Victoria, though not in South Australia.

It does not appear to be actively poisonous, but eaten in excess cannot fail to exercise injurious physical and even chemical action, and in any case its presence deteriorates pasture. It is more abundant in some seasons than others. Mowing to prevent seeding, resting pasture in spring, loosening and manuring soil, all aid in checking the growth. Cultivation will soon suppress the growth.

BROWN SPOTS ON PEARS.

Frances Branch of the Agricultural Bureau asks the cause of and treatment for "brown spots on Duchess pear trees, which spreads with a rough surface over the fruit and has a bitter taste."

Reply.—The Horticultural Instructor (Mr. Geo. Quinn) reports in respect to these:—

The "brown" patches scattered throughout the pulp of these pears consist of groups of lignified (woody) cells such as are normally found around the cores of pear fruits—more in some than others. Their presence can scarcely be called a disease, although some stimulus must have given rise to their formation where normal soft pulp tissue is usually located. The trouble has been observed in pear fruits on previous occasions, particularly in those of the Winter Bartlett variety, also in Winter Nelis. There is no remedy or preventive known to me, and if the fruits of the tree in question have consistently carried these defects, year after year, I advise the tree be cut off close to the ground and that grafts of some more desirable kind of pear be inserted.

APPLES FOR DAIRY COWS.

"If apples are fed to dairy cows, is the flow of milk increased or decreased?" asks the Meadows Branch of the Agricultural Bureau.

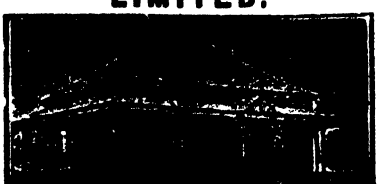
Reply.—The Dairy Expert (Mr. P. H. Suter) says provided the apples are fed in limited quantities, they will make the ration fed to the cows more palatable and will increase the milk flow. They should be sliced or pulped to remove danger of choking. The feeding value of apples is relatively low; they can only be of value in making the ration fed more palatable, and increase the milk flow slightly. If fed in large quantities, it is quite likely the milk flow would be decreased. They may be said to be equal to half the value of ensilage. If green and sour, they will reduce the milk flow; fed when eatable by children, say 10lbs. morning and night, they will be relished by cows.

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AGRICULTURAL BUREAU OF SOUTH AUSTRALIA PRUNING COMPETITIONS.

For the fourth year in succession, a series of pruning competitions has been arranged by Branches of the Agricultural Bureau situated on the River Murray Irrigation Settlements.

The centres at which competitions are to be held, and the dates of same, are as follows:—

DATES OF FIXTURES.

District Competitions.—Mypolonga, Friday, July 4th; Moorook, Tuesday, July 8th; Waikerie, Wednesday, July 9th; Cadell, Thursday, July 10th; Berri, Tuesday, July 15th; Renmark, Wednesday, July 16th.

Championship Competition.—Berri, Thursday, July 17th.

As usual, the competitions will be divided into two classes, namely, Vine Pruning and Fruit Tree Pruning.

VINE PRUNING CLASS.

(1) In this class each competitor will be required to prune:—(*a*) Five vines of the Muscat Gordo Blanco type; (*b*) five vines of the Zante Currant type; (*c*) five vines of the Sultana type.

(2) The first named (*a*) are to be pruned on the bush system.

(3) The second (*b*) are to be cordon or espalier spur pruned, at the discretion of the committee.

(4) The third named (*c*) are to be espalier rod and spur pruned.

(5) The competitors are required to twist and secure the rods to the trellis wires in the case of the Sultana vines.

(6) The time to be allowed for each class is determined by the various committees after examination of the vines and trees to be pruned in their respective districts. All competitors are required to cease work on expiration of time allowed.

The judges will allot points to each competitor in accordance with the scale of points set out below:—

Type.	Division.	Points.
Gordo—	Selection of fruiting wood	60
	Shaping of vines	12
	Clean cutting	18
Currant—	Selection of fruiting wood	60
	Shaping of vines	18
	Clean cutting	12
Sultana—	Selection of fruiting wood	52
	Twisting the canes	20
	Shaping the vines	36
	Clean cutting	12

In the event of it being found impossible to secure suitable bush vines, the committee may substitute espalier pruned Muscat Gordo Blanco or Doradillo vines in lieu thereof.

Fruit Tree Pruning Class.

(1) The competitors are required to prune one (or more, at the discretion of the committee):—(*a*) peach tree; (*b*) apricot tree; (*c*) pear tree.

(2) Time allowed for each class is governed by the some conditions as for vines.

(3) Judges will allot points to each competitor in accordance with the scale set out below:—

Type.	Division.	Points.
Peach—	Selection and treatment of fruiting wood	45
	Selection and treatment of leaders and shaping of tree	45
	Clean cutting	30
Apricot—	Selection and treatment of fruiting wood	45
	Selection and treatment of leaders and shaping of tree	30
	Clean cutting	15
Pear—	Selection and treatment of fruiting wood	36
	Selection and treatment of leaders and shaping of tree	36
	Clean cutting	18

Championship.

In addition to the district competitions referred to above, championship competitions will be held at Berri, on Thursday, July 17th. Championship events will be open to persons placed first, second, and third, respectively, in the district competitions, provided that each competitor in the championship competitions shall have secured an average minimum of 75 per cent. of the total marks awarded in the section for which he enters, and provided, also, that he shall have gained a certificate (*i.e.*, 80 per cent. of the marks awarded) in two of the three sections in the district competitions.

For the arrangements of the championship events, a committee consisting of one representative from the Branches of the Agricultural Bureau in the centres at which the competitions are being held was determined on. Mr. W. R. Lewis, of Berri, will act as Hon. Secretary.

Scale of Points for Championship.

In order more definitely to encourage speed, points are included for "time" in the scale of points for the championship events. This is as follows:—

Type.	Division.	Points.
Gordo—	Selection of fruiting wood	58
	Shaping of vines	10
	Clean cutting	16
	Time	6

Type.	Division	Points.
Currant—	Selection of fruiting wood	58
	Shaping of vines	16
	Clean cutting	10
	Time	6
Sultana—	Selection of fruiting wood	50
	Twisting the canes	18
	Shaping the vines	34
	Clean cutting	12
	Time	6
Peach—	Selection and treatment of fruiting wood	45
	Selection and treament of leaders and shaping of tree	45
	Clean cutting	24
	Time	6
Apricot—	Selection and treatment of fruiting wood	44
	Selection and treatment of leaders and shaping of tree	28
	Clean cutting	12
	Time	6
Pear.—	Selection and treatment of fruiting wood	34
	Selection and treatment of leaders and shaping of tree	34
	Clean cutting	16
	Time	6

SOLANUM ROSTRATUM.

A PROCLAIMED NOXIOUS WEED.

During the month, the Department of Agriculture has received from members of Branches of the Agricultural Bureau at Naracoorte, and at Green Patch, Port Lincoln, specimens of a plant which on examination was found by Professor T. G. B. Osborn, D.Sc., to be *Solanum rostratum* (Dun).

The first record of this weed in this State was a note by Professor Osborn in the *Journal of Agriculture*, of May, 1917. The plant was proclaimed noxious in December, 1921, but in the meantime had spread pretty widely over the State.

Professor Osborn describes it as an annual which grows erect with stems as much as 2ft. high, branching freely. It is thickly covered with yellowish star-shaped hairs, and also numerous yellow, spine-like prickles. These latter are often nearly half an inch long, and make

the plant very objectionable to handle, either green or dried. The leaves are oval in shape, irregularly lobed with two or three indentations on each side. They, too, are prickly along the main veins.

The flowering clusters are freely produced at the side of the stem, the flower stalks being exceedingly prickly. The calyx also is densely covered with prickles; it remains after the petals have fallen, and almost completely encloses the berry. The fruit thus is an intensely



Solanum Rostratum (Dun).

prickly burr, an inch or so in diameter, including the spines. It is thus unlike the tomato-like berry of the Sodom apple and other solanums.

The petals are five in number, and form a yellow star. One of the stamens is much longer than the remaining four, and curves upwards at the front (anterior side) of the flower. From this feature the specific name "rotratum" (beaked) is derived.

EYRE PENINSULA EXPERIMENTAL FARM HARVEST REPORT, 1923-24.

[By Rowland Hill, Manager.]

This farm consists of 3,041 acres, comprising sections 26, 27, and 28, in the hundred of Minnipa, and is situated 158 miles north of Port Lincoln, on the Port Lincoln to Cape Thevenard railway.

It is fairly centrally placed in relation to the whole of Eyre Peninsula, and is the point from which departmental activities in agricultural matters on that vast stretch of arable land will proceed.

The greater part of the farm will be arable when the natural growth has been removed. It consists of soil varying from light-colored, light-textured sands, carrying broom-brush and porcupine, to heavy calcareous soils, with a tendency to run together and set hard.

The bulk of this land is between these two extremes, and consists of calcareous soils of medium texture, carrying naturally big mallees, and large bushes as undergrowth. The land which has been used for cultivation on this farm has been grubbed, and so freed practically of all stumps and roots.

At the present time there are approximately 1,200 acres of this land cleared, and additions are being made to this annually.

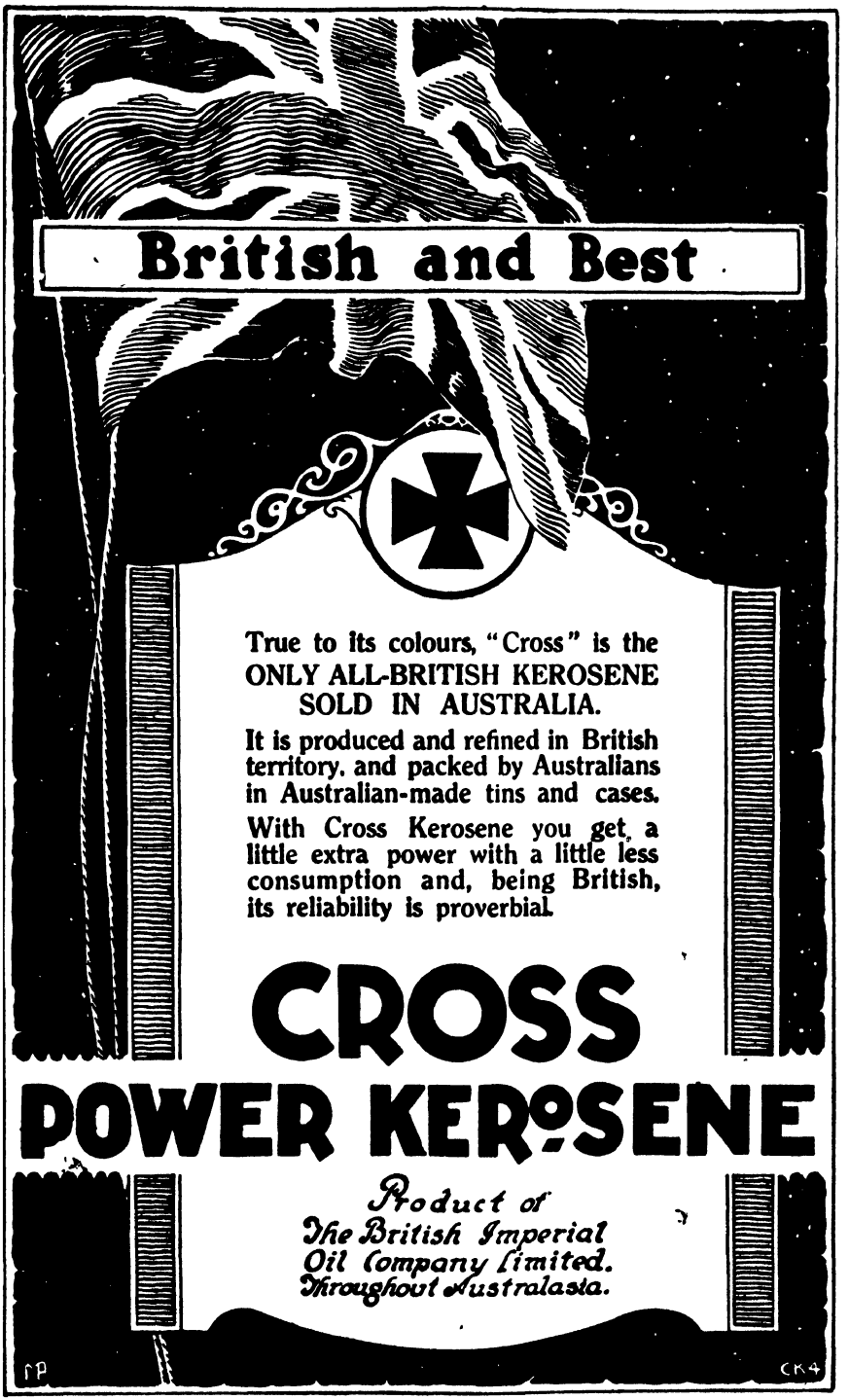
The above-mentioned sections were dedicated a reserve for agricultural purposes in November, 1914, and work was commenced and a manager appointed on January 1st, 1915.

The Season 1923.

During the months of January and February no rain fell, and right up to the end of April there had only been a total of 38 points. This made it necessary to do a considerable amount of the seeding in dry soil, but fair rains fell during May, there being 122 points recorded for that month. From this on, well-distributed rains fell during each month.

The total rain received during the year is not very high, being only 11.79in., but nearly all this rain fell during the period April to November—the total useful rains over these months being 10.15in., which fell during 72 raining days, with no rain registered for November. The usual extreme weather conditions during September and October were not experienced this year, which all helped towards the satisfactory yields harvested.

There was very little disease to be found in cereals during the season, except in one or two instances. All varieties filled well, and


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taken right through the yields were very satisfactory, especially so when it is taken into consideration that the majority of the area cropped was stubble land.

Harvesting conditions were anything but pleasant, and much delay was caused through damp and cold weather. Rains in December were the cause of some wheats being bleached, and I feel certain that wheat harvested after these rains lost considerably in weight.

When wheat is harvested after rain, there is always a chance of a few whiteheads in the sample, which would help to lighten the bags.

The following table sets out in detail the rainfall recorded, together with that registered at the farm since January, 1915:—

Rainfall Distribution at Minnipa, 1915-1923.

	1915.	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	Means, 1915-1923.
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In
January	0·74	0·80	2·02	0·46	0·50	1·02	2·69	0·53	—	0·97
February	0·09	0·04	0·40	0·02	2·49	—	4·69	0·44	—	0·91
March	0·02	0·44	0·94	0·46	0·02	0·42	3·17	0·04	0·07	0·62
April	1·18	0·27	0·42	0·97	0·58	0·43	0·54	0·44	0·31	0·57
May	2·03	1·23	2·84	1·14	0·66	2·14	2·14	1·37	1·22	1·64
June	1·88	3·67	2·64	1·41	0·74	3·31	2·11	1·10	2·54	2·16
July	2·54	3·60	3·08	0·77	0·70	2·15	0·88	2·06	2·25	2·00
August	3·57	2·55	3·17	2·68	0·81	2·83	0·78	1·50	1·79	2·19
September	0·98	2·33	2·81	0·05	1·32	1·97	0·68	0·50	1·32	1·33
October	0·41	1·92	1·46	1·45	0·65	2·05	1·07	0·31	0·72	1·11
November	—	1·05	1·58	—	0·11	1·40	0·61	0·08	—	0·54
December	0·44	0·12	0·33	0·61	1·49	0·36	1·52	1·70	1·57	0·90
Totals	13·88	18·02	21·69	10·02	10·07	18·08	20·88	10·07	11·79	14·94
Total "Useful" rain, April-November	12·59	16·62	18·00	8·47	5·57	16·28	8·81	7·36	10·15	11·54

Distribution of "Useful" Rainfall, Minnipa, 1915-1923.

	1923.	Means 1915-23.
	In.	In.
Seeding rains (April-May)	1.53	2.21
Winter rains (June-July)	4.79	4.16
Spring rains (August-October)	3.83	4.63
Early summer rains (November)	nil	0.54
Totals	10.15	11.54

Crops.

Seeding operations were commenced on April 10th with oats for hay, and completed on June 8th with wheat on new land. As in the previous year, there was not sufficient rain to germinate the wild mustard seed on fallowed land: hence additional seed was sown per

acre with the hope of crowding the mustard out. This proved to be very satisfactory, and there was ample evidence in the divisions between varieties to show the effect of the thick sowing of cereal seed.

The total area, namely, 639.43 acres, cropped with cereals this year was made up as follows:—

	Acres.
Fallowed land	224.27
Stubble land . .	405.70
New land	9.46
	639.43

From this it will be seen that the greater part of the area cropped was stubble land, which did exceptionally well to average 20bush. 51lbs. of wheat. New land, unfortunately, was seeded late, and showed a yield of 15bush. 36lbs. per acre only.

Hay Crops.

The hay cut was made up of Cape oats on fallow, Algerian oats on stubble, King's Red wheat on stubble and various headlands and corner pieces.

Cape oats were sown on April 13th on fallow at the rate of 80lbs. seed and 112lbs. 36 per cent. super per acre. This yielded a return of just over 2½ tons of hay per acre.

Algerian oats sown on April 10th on stubble land at the rate of 80lbs. seed and 112lbs. 36 per cent. super per acre yielded just a trifle over 1 ton per acre.

King's Red wheat sown on April 21st on stubble land at the rate of 90lbs. seed and 112lbs. 36 per cent. super per acre yielded 1 ton 10cwts. per acre.

Other pieces and headlands averaged about 1 ton 10 cwts per acre.

A total of 132 tons was cut from 80.62 acres showing an average yield of 1 ton 12cwts. 84lbs. per acre, which is quite satisfactory.

The following tables will show in detail the hay yields for this season, and also for the period 1915-1923:—

Hay Yields, Minnipa, 1923.

Variety and Field.	Area.	Total Yield.			Per Acre.		
	Acres.	T.	C.	L.	T.	C.	L.
Cape oats, Field No. 6 (fallow).	18.52	47	0	0	2	10	85
Algerian oats, Field No. 15 (stubble) . .	12.68	13	0	0	1	0	57
Headlands and corners, Field No. 6 . . .	8.97	14	0	0	1	11	24
Headlands, Fields Nos. 15, 2, and 5	12.88	16	0	0	1	4	95
King's Red, Fields Nos. 16 and 17	27.57	42	0	0	1	10	52
	80.62	132	0	0	1	12	84

Hay Returns, Minnipa, 1915-1923.

Year.	Total Rainfall.	"Useful" Rainfall.	Area.	Total Yield.			Yield Per Acre.		
	In.	In.	Acres.	T.	C.	L.	T.	C.	L.
1915	13.88	12.59	148.00	280	0	0	1	17	94
1916	18.02	16.62	2.34	4	0	0	1	14	19
1917	21.69	18.00	47.85	82	10	0	1	14	54
1918	10.02	8.47	30.60	28	0	0	0	18	34
1919	10.07	5.57	55.13	35	0	0	0	12	78
1920	18.08	16.28	62.99	165	15	93	2	12	72
1921	20.88	8.81	41.11	56	7	56	1	7	48
1922	10.07	7.36	112.19	147	0	0	1	6	23
1923	11.79	10.15	80.62	132	0	0	1	12	84
Means	14.94	11.54	—	—			1	10	81

Oat Crops.

The main oat crops for grain were sown on fallow at the rate of 80lbs. seed and 112lbs. 36 per cent. super per acre early in April. These were all sown under dry conditions, yet both Scotch Grey and Algerian came away well with the first rains, making very fine growth, and promising very heavy yields. The yields of 35bush. 20lbs. for Scotch Grey and 27bush. 5lbs. for Algerian are quite satisfactory, but not so high as these crops promised.

The remainder of the oat crops were on stubble land, sown at the rate of 70lbs. seed and 112lbs. of 36 per cent. super per acre. These were all small lots worked up from small parcels of seed sent here two years ago. Although some of the areas were small, they were large enough to enable one to form an opinion as to how the varieties are likely to yield in this district. Of these new varieties, the two which yielded highest returns for this year are certainly promising, not alone because of their yielding powers.

Kherson, the highest yielder, is early; holds its grain well, and has a rigid straw, which is not very tall.

Stark's Hooimaker is a tall oat suitable for hay; is early, and stools well, and also stands up very well.

Guyra has a plump brown grain, fairly fine straw which should make good hay, but is not perhaps as suitable for this district as some of the earlier oats.

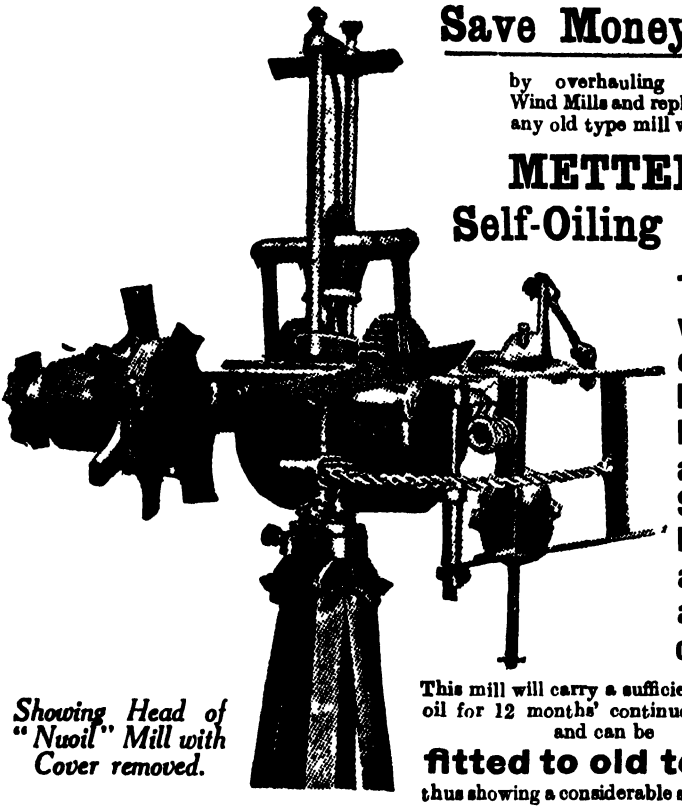
Although Lachlan was not a very high yielder, I have great faith in this oat being a valuable variety for this district.

Burt's Early was very disappointing. It will, however, be given another trial.

Early Bathurst did not yield very heavily, but made fine autumn growth, and for this reason should make a good oat for sowing for early feed. The grain is a plump and attractive one.

Kelsall's is a very fair yielder, rather too short in the straw for hay, but should be a good oat for this district on account of its

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short period of growth, and also its ability to withstand severe conditions. This is a very early oat, and has a long yellow grain.

Bathurst 4 is a good yielder and also makes splendid autumn growth, but shows a tendency to lodge.

These varieties, and also other new oats, are worth a fair trial, and to give them this they must be tested over a period of years.

The following tables will show the individual yields of the varieties grown this year, and also the farm average over the period 1916-1923:—

Yields of Oat Varieties, Minnipa, 1923.

Variety.	Field No.	Area. Acres.	Total Yield. Bush.	lbs.	Yield Per Acre. Bush.	lbs.
Kherson	6	.39	15	38	40	36
Stark's Hooimaker	6	.39	15	37	40	33
Kherson	6	1.48	58	32	39	29
Guyra	6	1.57	59	36	38	6
Mulga	6	.39	14	8	36	16
Scotch Grey	5	17.19	610	15	35	20
Bathurst 4	6	.68	23	11	34	9
Stark's Hooimaker	6	.88	29	7	33	6
Kelsall's	6	.79	24	38	31	23
Lachlan	6	2.73	79	11	29	2
Burt's Early	6	.71	19	37	28	3
Early Bathurst	6	1.28	34	31	27	7
Algerian	5 and 6	17.10	463	37	27	5
Burt's Early	6	.69	15	15	22	11
Farm average		46.27	1,465	33	31	27

Oat Returns, Minnipa, 1916-1923.

Year.	Total Rainfall. In.	Useful Rainfall. In.	Area. Acres.	Total Yield. Bush.	lbs.	Yield per Acre. Bush.	lbs.
1916	18.02	16.62	49.90	1,987	20	39	33
1917	21.69	18.00	10.39	461	22	44	17
1918	10.02	8.47	21.03	568	12	27	1
1919	10.07	5.57	14.75	85	16	5	32
1920	18.08	16.28	20.92	903	30	43	48
1921	20.88	8.81	15.65	440	2	28	5
1922	10.07	7.36	25.04	398	8	15	36
1923	11.79	10.15	46.27	1,465	33	31	27
Means	**15.33**	**11.41**	—	—		**29**	**20**

Scotch Grey and Algerian are the only two varieties grown over the period 1917 to 1923, and the mean yields for this period are shown in the following table:—

Oat Varieties, 1917-1923

Variety.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	Means.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
Scotch Grey .	44 35	29 37	15 18	44 3	29 12	14 23	35 20	30 21
Algerian . . .	37 7	25 12	18 29	45 27	31 25	16 23	27 5	28 37
Farm average	44 17	27 1	5 32	43 8	28 5	15 36	31 27	29 20

Barley Crops.

Three varieties of barley were grown on stubble land cultivated ahead of the drill, and then harrowed after the drill. They were sown at the rate of 50lbs. seed and 112lbs. of 36 per cent. super per acre.

An average yield of 30bush. 28lbs. resulted, which is very satisfactory. Tunis No. 1 was the highest yielder. This variety has proved to be the best variety tested here up to date. It is very early, suitable both for grain and greenfeed.

The following tables will show individual yields for 1923, and details of all barley crops grown at the farm since 1917:-

Yields of Barley Varieties, Minnipa, 1923.

Variety.	Field No.	Area. Acres.	Total Yield. Bush. lbs	Per Acre. Bush. lbs.
Tunis No. 1 . . .	9	13.99	462 40	33 4
Roseworthy Oregon .	9	7.46	226 12	30 16
Tunis No. 4	9	7.51	195 40	26 4
Farm average	..	28.96	884 42	30 28

Barley Yields, Minnipa, 1917-1923.

Year.	Total Rain. In.	Useful Rain. In.	Area. Acres.	Total Yield. Bush. lbs.	Yield Per Acre. Bush. lbs.
1917	21.69	18.00	7.13	233 34	32 39
1918	10.02	8.47	11.85	261 39	22 5
1919	10.07	5.57	8.07	49 24	6 7
1920	18.08	16.28	—	—	—
1921	20.88	8.81	10.08	192 1	19 2
1922	10.07	7.36	33.63	582 43	17 16
1923	11.79	10.15	28.96	884 42	30 28
Means	14.66	10.66	—	—	18 14

Rye Crop.

As in previous years, only a small area of rye was sown, and this was put down on stubble land which was cultivated ahead of the drill

and harrowed after it. The rate of sowing was 60lbs. seed and 112lbs. of 36 per cent. super per acre.

Seed was sown during the first week in June. The yield, 11bush. 53lbs. per acre, is quite satisfactory compared with other years. The crop was stripped for grain, and the straw was then cut for thatching purposes.

The following table will show the individual yields, and also the mean yield over the period 1917 to 1923:—

Rye Returns, Minnipa, 1917-1923.

Year.	Total Rain. In.	Useful Rain In.	Area Acres.	Total Yield. Bush.	lbs.	Yield Per Acre. Bush.	lbs.
1917	21.69	18.00	3.86	61	54	16	2
1918	10.02	8.47	2.72	21	36	7	56
1919	10.07	5.57	1.92	2	38	1	22
1920	18.08	16.28	2.02	10	34	5	14
1921	20.88	8.81	1.82	11	47	6	26
1922	10.07	7.36	3.34	46	7	13	48
1923	11.79	10.15	2.61	29	44	11	23
Means	14.66	10.66	—	—		8	53

Wheat Crops.

The farm average for wheat this year, 22bush. 4lbs. over an area of 480.97 acres, is quite satisfactory, especially when it is taken into consideration that the greater portion of this area, namely, 307.79 acres, was grown on stubble land.

Fallow Land.—The yields from fallow were also pleasing, and in this case, in considering this average of 24bush. 42lbs. per acre, it must be remembered that experimental plots are included in it, and these tend to reduce the total average. For example, such plots as "no manure" in the manurial tests, and the low seedings in the "seeding" tests, all help to reduce an average.

Currawa, the highest yielding variety, was a fine crop, and the average of 34bush. 1lb. goes to prove what can be done on this land with fallow. This particular variety is certainly a suitable one for this district, and I feel certain that with settlers fallowing more extensively, much can be expected from this wheat. It is quite late enough for conditions prevailing here, and cannot be recommended for soils which have a tendency to dry out quickly, but the little extra moisture in fallow, and the more compact nature of the older soils, will suit it.

Other varieties which have done well are Caliph, Sultan, Late Gluyas, and Queen Fan, as will be seen by the following table:—

Wheat Varieties on Fallow, Minnipa, 1923.

Variety.	Field No.	Area. Acres.	Total Yield. Bush.	lbs.	Yield Per Acre. Bush.	lbs.
Currawa	5	7.94	270	4	34	1
Caliph	2	10.97	327	38	29	52
Late Gluyas	5	10.30	293	50	28	32
Sultan	2	10.98	311	37	28	23
Queen Fan	5	6.42	175	26	27	20
Walker's Wonder	2	.50	13	37	27	14
President (3cwts. super.)	2	1.90	51	0	26	51
Rajah	2	11.89	308	26	25	56
Silver Baart	5	8.56	220	45	25	47
President (2cwts. super.)	2	1.95	50	11	25	44
President (check)	2	1.32	33	47	25	36
President (1cwt. super)	2	1 95	48	32	24	53
King's White	2	6.43	157	19	24	28
Emperor (75lbs. seed)	2	1.86	45	23	24	24
Walker's Wonder	2	[illegible]	100	0	24	6
Caliph	2	2 08	50	4	24	4
Gluyas	2	15.08	362	41	24	3
Faun	2	1.91	45	4	23	36
Emperor (90lbs. seed)	2	1.95	45	59	23	35
Federation	2	5.64	131	9	23	15
Felix	2	11.07	257	8	23	14
Baroota Wonder	2	1.40	32	32	23	14
President (½cwt. super)	2	1.95	45	7	23	8
Canaan	2	2.43	56	5	23	5
Emperor (check)	2	1.95	43	23	22	15
Currawa	2	.43	9	53	22	59
Canberra	2	.62	13	14	21	21
Emperor (60lbs. seed)	2	1.90	41	17	21	44
President (no manure)	2	1.86	38	0	20	26
Baroota Wonder	2	4.53	90	18	19	56
Emperor (50lbs. seed)	2	1.95	36	26	18	41
Emperor (40lbs. seed)	2	1.86	34	10	18	22
Smutproof	5	15.44	261	16	16	55
Canaan	2	.69	11	27	16	36
Emperor (30lbs. seed)	2	1.86	30	26	16	22
Farm average on fallow, 1923		163.72	4,043	14	24	42

Unless otherwise stated, the rate of seeding for all varieties on fallow was 80lbs. seed and 112lbs. 36 per cent. super per acre.

Stubble Land.—The cultivation given Fields Nos. 16, 17, and 18 was as follows:—

Ploughed during February, cultivated and harrowed ahead of the drill, then harrowed again after the drill.

Seeding for the fields was at the rate of 90lbs. seed and 112lbs. of 36 per cent. super per acre.

Field No. 15 was cultivated early in April, but rain set the soil, and it had to be cultivated again ahead of the drill, and was harrowed after drilling.

All this field was seeded at the rate of 80lbs. seed and 112lbs. 36 per cent. super per acre.

Field No. 8 was cultivated, then harrowed ahead of the drill, and harrowed after drilling.

All wheat on this field was sown at the rate of 60lbs. seed and 112lbs. 36 per cent. super per acre.

Wheat Yields on Stubble Land, Minnipa, 1923.

Variety.	Field No.	Area. Acres.	Total Yield. Bush. lbs.	Yield Per Acre. Bush. lbs.
King's White	6	1.71	41 12	24 6
Currawa	8	51.10	1,167 31	22 51
Maharajah	18	24.26	538 51	22 13
Caliph	15	104.48	2,326 53	22 16
Red Russian	8	48.28	1,047 14	21 41
Maharajah	15	6.26	130 0	20 47
Emperor	15	16.80	302 29	18 0
King's White	16 and 17	54.90	861 47	15 42
Farm average on stubble		307.79	6,416 6	20 51

"New" Land.—Owing to the extreme difficulty experienced in burning the grubbed scrub, only 10 acres of Field No. 14 was ready in time to be seeded to wheat. This block of land was ploughed by the 6th of June, 1923, and on the 8th of the month was seeded with 80lbs. President wheat, 1cwt. superphosphate per acre, and yielded as follows:—

Wheat on New Land, Minnipa, 1923.

Variety.	Field No.	Area. Acres.	Total Yield. Bush. lbs.	Yield Per Acre. Bush. lbs.
President	14	9.46	150 46	15 56

The returns secured from the various soil treatments, as set out above, when grouped together, as in the next table, show the farm average for the year to be 22bush. 4lbs. per acre:—

Farm Wheat Average, Minnipa, 1923.

Where Grown.	Area. Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
Fallow	163.72	4,043 14	24 42
Stubble land	307.79	6,416 6	20 51
New land	9.46	150 46	15 56
1923 total wheat average	480.97	10,610 6	22 4

Taken over a period of eight years, the farm average for wheat is 19bush. 39lbs. During that period 1,871.75 acres have been reaped for grain. Taking into consideration that this includes a big range of varieties, different soil cultivations, numerous rates of seeding, some years of low rainfall, the prospects of much higher returns are bright once fallowing is more extensively practised.

During the period mentioned, the average annual "total" rainfall has been 15.33in., and the average annual "useful" rainfall 11.41in.

Wheat Yields, Minnipa, 1916-1923.

Year.	Total Rainfall. In.	Useful Rainfall. In.	Area. Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
1916	18.02	16.62	171.73	4,908 6	28 35
1917	21.69	18.00	76.65	1,999 34	26 5
1918	10.02	8.47	141.37	3,022 55	21 23
1919	10.07	5.57	112.52	980 40	8 43
1920	18.08	16.28	196.51	5,040 8	25 39
1921	20.88	8.81	219.96	2,058 24	9 21
1922	10.07	7.36	472.04	7,234 36	15 20
1923	11.79	10.15	480.97	10,610 6	22 4
Means	15.33	11 41		Average for 8 years	19 39

The following table will show that from the year 1918 to 1923, wheat on fallow showed an advantage over new land of just over 4bush. per acre.

Wheat Yields From Various Soil Treatments, Minnipa, 1918-1923.

Year.	Total. Rain. In.	Useful Rain. In.	Fallow. Bush. lbs.	New Land. Bush. lbs.	Stubble. Bush. lbs.	Farm Average. Bush. lbs.
1918	10.02	8.47	23 44	14 12	18 14	21 23
1919	10.07	5.57	9 36	9 21	3 11	8 43
1920	18.08	16.28	30 8	22 38	13 5	25 39
1921	20.88	8.81	10 4	8 2	9 0	9 21
1922	10.07	7.36	12 37	16 3	--	15 20
1923	11.79	10.15	24 42	15 56	20 51	22 4
Means	13.48	9.44	18 29	14 22	—	17 5

EXPERIMENTAL PLOTS.

No new land was available for these tests this year, hence they were conducted on fallowed land.

Manurial Tests.—To determine the effect of varying dressings of superphosphate to wheat, plots were sown with quantities ranging up to 3cwts. per acre. The results are tabulated below:—

Manurial Tests on Fallow, Minnipa, 1923.

Variety:—President.

Manure per Acre.	Area. Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
No manure	1.86	38 0	20 26
½cwt. (36 per cent. super)	1.95	45 7	23 8
1cwt. (36 per cent. super)	1.95	48 32	24 53
2cwts. (36 per cent. super)	1.95	50 11	25 44
3cwts (36 per cent. super)	1.90	51 0	26 51
Check	1.32	33 47	25 36

It will be noticed that the yield for the "no manure" plot is higher this year that it has ever been before, and this can be attributed to the fact that in all other years the test has been on new land.

and that it is on fallow this year which has been manured in previous years.

Over a period of seven years the 1cwt. dressing of super shows an advantage on the average of 5bush. 20lbs. per acre over no manure, as will be seen by the following table:—

Manurial Tests With Wheat, Minnipa, 1917-1923.

Year.	No Manure.	½cwt. Super.	1cwt. Super.	2cwts. Super.	3cwts. Super.	Farm Average.	Total Rain.	Useful Rain.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	In.	In.
1917	15 35	26 48	29 39	31 17	31 9	26 5	21.69	18.00
1918	8 6	10 47	9 53	10 38	13 46	21 23	10.02	8.47
1919	2 44	6 12	7 47	10 7	9 57	8 43	10.07	5.57
1920	19 36	21 54	20 54	21 16	24 9	25 39	18.08	16.28
1921	3 13	6 58	8 35	8 53	8 24	9 21	20.88	8.81
1922	10 39	14 57	15 58	15 28	15 45	15 20	10.07	7.36
1923	20 26	23 8	24 53	25 44	26 51	22 4	11.79	10.15
Means	11 28	15 49	16 48	17 38	18 34	18 22	14.66	10.66

Testing the Effect of Different Quantities of Seed Per Acre.

Tests designed to ascertain the effect of different quantities of seed per acre were also carried out on fallow this year, because no new land was available.

Over a period of six years the average yields show a gradual increase in proportion to the rate of seeding up to 75lbs. The same is the case for the year 1923, where 75lbs. of seed per acre shows an increase of 8bush. per acre over a 30lbs. per acre seeding.

The following tables will show the results of this year's tests, and also over the period 1918-1923.

Rates of Seeding Tests With Wheat, Minnipa, 1923.

Variety:—Emperor.

Seed per acre.	Area. Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
30lbs. Emperor	1.86	30 26	16 22
40lbs. Emperor	1.86	34 10	18 22
50lbs. Emperor	1.95	36 26	18 41
60lbs. Emperor	1.90	41 17	21 44
75lbs. Emperor	1.86	45 23	24 24
90lbs. Emperor	1.95	45 59	23 35

Rates of Seeding Tests With Wheat, Minnipa, 1918-1923.

Year.	Total Rain.	Useful Rain.	Yield per acre. 30lbs. seed.	40lbs. seed.	50lbs. seed.	60lbs. seed.	75lbs. seed.	90lbs. seed.	Farm Average.
	in.	in.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
1918 ..	10.02	8.47	16 26	17 34	15 52	17 12	14 17	17 43	21 23
1919 ..	10.07	5.55	10 10	9 41	10 26	11 53	13 31	12 9	8 43
1920 ..	18.08	16.28	6 44	7 51	10 41	8 55	11 35	10 31	25 39
1921 ..	20.88	8.81	6 30	6 47	6 4	6 6	6 2	5 30	9 21
1922 ..	10.07	7.36	18 33	19 9	19 45	19 52	19 32	19 39	15 20
1923 ..	11.79	10.15	16 22	18 22	18 41	21 44	24 24	23 35	22 4
Means	13.49	9.44	12 28	12 54	13 25	14 17	14 54	14 51	17 5

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Pickling Tests.

During 1923 we commenced a series of tests designed to determine the relative effectiveness of a number of different methods of treating seed wheat for the control of Stinking Smut (*Tilletia tritici*).

The plots, numbered 1 to 5, were sown with seed treated in the manner set out as under:—

Plot No. 1.—Sown with untreated seed.

Plot No. 2.—Sown with seed treated with Faulding's Dollman's Friend, at the rate of one packet of powder to 1½galls. of water, which was sufficient to pickle 6bush. of seed. This was pickled on a concrete floor and turned five times with a shovel, then spread out to dry, and sown the following day.

Plot No. 3.—Sown with seed pickled in an old churn with dry copper carbonate at the rate of 3oz. of powder to the bushel. It was possible to treat a bushel at a time in this manner. This seed was sown during the day on which it was treated.

Plot No. 4.—Sown with seed treated with a 1½ per cent. solution of copper sulphate, at the rate of 1gall. of solution to a bushel of seed. This was pickled on a concrete floor and turned five times with a shovel, then spread out to dry, and sown the following day.

Plot No. 5.—Sown with seed treated with a ¼ per cent. solution of formalin at the rate of 1gall. of solution to the bushel of seed. This was pickled on a concrete floor and turned five times with a shovel, then sown the same day.

Field Inspection.

The crops were inspected directly after germination, during the last week in July, and when they had reached maturity. As a result of these inspections the following observations were made:—

Plot No. 1 (untreated seed).—Came away well, there being a very good germination, and no check whatever in the growth. Stooling was very good right through the plot. There was evidence of smut right through it, but only a trace, and not as high a percentage as in the copper sulphate test. It was particularly noticeable in this plot that there were not the number of small heads commonly known as second growths that there were in the other plots.

Plot No. 2 (Faulding's Dollman's Friend).—This plot came away splendidly, and showed ahead of all the other plots for the first six weeks, but it then had a decided check in the growth. The crop appeared healthy enough, but did not move anything like as quickly from then on. The germination was only fair. The stooling was moderate. The heads were very well developed. There was a trace of smut through it, and the crop was a little later ripening than the remainder.

Plot No. 3 (copper carbonate).—This plot came away with the untreated plot, but the germination was not so good. The stooling was very fair, and the development of head good; but the crop shows as much smut as the untreated plot.

Plot No. 4 (copper sulphate).—This was the last plot to come away, although it had the advantage of being seeded several days before the untreated plot. The germination was fair, and the stooling quite good. There was more evidence of second growths in this plot than in any of the others. There was also considerably more smut in this plot than in any of the others.

Plot No. 5 (formalin).—This came away ahead of the copper sulphate treatment which was the next plot to it. It showed a very fair germination, good stooling, and the development of the heads was very fair. This plot was more free from smut than any of the others. The only smut to be found in it was an odd head or so right through it.

Wheat Yields From Various Pickling Tests on Stubble Land, Winnipa, 1923

Variety:—Caliph.

Plot.	Pickling treatment.	Acres.	Total Yield Bush. lbs.	Yield. Bush. lbs.
No. 5.	¼ per cent. solution formalin . . .	29.61	647 23	21 52
No. 4.	1½ per cent. solution bluestone . .	20.98	431 58	20 35
No. 3.	3ozs. copper carbonate to 1bush. of wheat	33.64	782 58	23 16
No. 2.	Faulding's Dollman's Friend . . .	4.30	109 41	25 30
No. 1.	Untreated seed	15.95	354 53	22 15

COMMENTS ON THE PICKLING TESTS.

All the fungicides used evidently had a retarding effect on the germination of the grain. No one of them resulted in a crop absolutely free of smut. Formalin was the most successful, the crop grown from seed treated with this containing a mere trace of smut only. The use of Dollman's Friend apparently resulted in a lengthening of the period between germination and maturity.

In all plots on which smut was found, it was worse on patches of land where the soil was hard and the cultivation had not been so good. With the copper carbonate treatment there was no evidence of corrosion on the drill at the time the seed was put through it, but two months later, when the drill was being used for seeding other crops, parts of it had corroded.

WHEAT CROP COMPETITION.

GOVERNMENT SCHEME FOR ENCOURAGING.

With the object of encouraging wheat crop competitions in South Australia, the Government has offered to assist groups of Branches of the Agricultural Bureau who are willing to arrange competitions, by undertaking to help Branches to secure suitable judges, to provide rail fares for judges to travel to and from the place of competition, and also to make a monetary grant of 10s. for each entry received in the competition, provided an amount equivalent to such grant is collected by the Branches. This is limited to £25 in any one year to any one group of Branches. The proposal has been made the subject of considerable discussion at various Conferences of the Agricultural Bureau held during the current year, and at these Conferences it was determined to arrange competitions in the areas set out below:—

District No. 1.—The area served by the lines of railway between Owen and Wirrabara.

District No. 2.—The country east and adjacent to the Gulf, between Kadina and Baroota.

District No. 3.—The area served by the lines of railway between Hamley Bridge and Spalding, and Hamley Bridge and Farrell's Flat.

District No. 4.—The wheat-growing area to the west of the line between Salisbury and Balaklava.

District No. 5.—The area in the hundreds of Wallaroo, Kadina, and Kulpara, south of the line between Wallaroo and Melton, and the hundreds of Tiparra, Clinton, Kilkerran, Maitland, and Cunningham.

District No. 6.—The wheat-growing area south of what is generally known as the Maitland District.

Competitions in each of these districts will be conducted by Committees consisting of one representative selected by each Branch of the Agricultural Bureau in the district. These committees have already been formed, and the following gentlemen have been selected as Secretaries of the respective competitions:—

District No. 1.—Mr. A. O. Badman, Yacka.
District No. 2,—Mr. A. M. Lawrie, Nelshaby.
District No. 3.—Mr. A. H. Fuller, Tarlee.
District No. 4.—Mr. W. J. Marshman, Owen.
District No. 5.—Mr. G. F. Pearce, Maitland.
District No. 6.—Mr. G. L. Tucker, Brentwood.

Each district will be a self-contained unit, and will, within certain limits, govern its own affairs. To be eligible for Government assistance, however, the districts will need to conduct their competitions to the satisfaction of a Committee consisting of the Director of Agriculture (Professor Arthur J. Perkins), the Superintendent of Experimental Work (Mr. W. J. Spafford), Chairman of the Advisory Board of Agriculture (Mr. W. S. Kelly), and the Secretary of the Advisory Board of Agriculture (Mr. H. J. Finnis).

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A. SAIDE, A.F.I.A., Secretary (Late of Federal Taxation Dept.).

CONDITIONS OF ENTRY.

The competitions are not confined to members of the Agricultural Bureau, but it is hoped that farmers generally throughout the State will take the opportunity of submitting entries. Each crop entered must be of an area of not less than 50 acres. Entries need not necessarily be confined to one variety, but the maximum number of varieties that will be permitted in one entry is three. Each entry must be in one block or paddock. Should, however, a person desirous of submitting a crop for competition not have an area of 50 acres or more in one paddock or block, he may submit as an entry the whole of one paddock or block of wheat, together with an area of one other paddock or block, sufficient to make up the minimum area of 50 acres. The crops entered for competition will be judged to the following scale of points:—Apparent yield, 60; trueness to type, 10; freedom from disease, 10; freedom from weeds, 15; evenness of crops, 5—total, 100. Competitors will be required to supply the judge with details in respect to the following:—(1) The area of each variety constituting the entry; (2) the date of seeding; (3) the rate of seeding; (4) the nature and quantity of any fertiliser used.

Other competition districts are in course of formation, and it is anticipated that these will be finalised in the immediate future.

These should cover the principal wheat-growing areas of the State, and it is, therefore, expected that a very considerable number of entries will be received.

FODDERS IN PLACE OF WHEAT.

A farmer with a holding situated between Balaklava and Long Plains, the soil of which, according to his description, is of a sandy nature and inclined to drift, has intimated that he proposes to grow fodder plants in preference to wheat. He has sought the guidance of the Department of Agriculture on the proposal, and asked for information with respect to lucerne, Sudan grass, and Johnson grass. For his guidance, the Superintendent of Experimental Work (Mr. W. J. Spafford) has supplied the following information:—

"Sudan grass, like the other sorghums, is essentially a crop for good soils, and if maximum returns are to be secured without irrigation, sub-tropical to tropical conditions are necessary. When grown in semi-arid conditions, good crops can be secured with the aid of artificial irrigation, and in temperate climate where sufficient rain falls in the summer, success can be secured by growing these crops in rows, and keeping the land between the rows well cultivated throughout the growing period. In your district Sudan grass could not be depended upon, because of the scantiness of summer rainfall in average years.

"To convert your farm into a livestock proposition, I would suggest that lucerne will be the most useful fodder plant you can grow, and in a general way, I should say the farm could be economically worked as follows:—

1925.—*Field No.* 1.—Rye grass and clover (seeded). *Field No.* 2.—Oats and barley. *Field No.* 3.—Lucerne (seeded). *Field No.* 4.—Lucerne (seeded). *Field No.* 5.—Pasture. *Field No.* 6.—Rye grass and clover seeded.

1926.—*Field No.* 1.—Rye grass and clover. *Field No.* 2.—Lucerne (seeded). *Field No.* 3.—Lucerne. *Field No.* 4.—Lucerne. *Field No.* 5.—Pasture. *Field No.* 6.—Rye grass and clover.

1927.—*Field No.* 1.—Lucerne (seeded). *Field No.* 2.—Lucerne. *Field No.* 3.—Lucerne. *Field No.* 4.—Lucerne. *Field No.* 5.—Rye grass and clover (seeded). *Field No.* 6.—Rye grass and clover.

1928.—*Field No.* 1.—Lucerne. *Field No.* 2.—Lucerne. *Field No.* 3.—Lucerne. *Field No.* 4.—Rye grass and clover (seeded). *Field No.* 5.—Rye grass and clover. *Field No.* 6.—Lucerne (seeded).

1929.—*Field No.* 1.—Lucerne. *Field No.* 2.—Lucerne. *Field No.* 3.—Rye grass and clover (seeded). *Field No.* 4.—Rye grass and clover. *Field No.* 5.—Lucerne. *Field No.* 6.—Lucerne.

1930. *Field No.* 1.—Lucerne. *Field No.* 2.—Rye grass and clover (seeded). *Field No.* 3.—Rye grass and clover. *Field No.* 4.—Lucerne (seeded). *Field No.* 5.—Lucerne. *Field No.* 6.—Lucerne.

1931.—*Field No.* 1.—Rye grass and clover (seeded). *Field No.* 2.—Rye grass and clover. *Field No.* 3.—Lucerne (seeded). *Field No.* 4.—Lucerne. *Field No.* 5.—Lucerne. *Field No.* 6.—Lucerne.

1932.—*Field No.* 1.—Rye grass and clover. *Field No.* 2.—Lucerne (seeded). *Field No.* 3.—Lucerne. *Field No.* 4.—Lucerne. *Field No.* 5.—Lucerne. *Field No.* 6.—Rye grass and clover (seeded).

1933.—*Field No.* 1.—Lucerne (seeded). *Field No.* 2.—Lucerne. *Field No.* 3.—Lucerne. *Field No.* 4.—Lucerne. *Field No.* 5.—Rye grass and clover (seeded). *Field No.* 6.—Rye grass and clover.

"The rye grass and clover would consist of a mixture of 10lbs. Wimmera rye grass, ½lb. Subterranean clover, and 10lbs. King Island melilot per acre.

"Lucerne would be seeded at the rate of about 10lbs. seed per acre. The field seeded with lucerne would receive about 4cwts. superphosphate per acre, and the one seeded with rye grass and clover a dressing of about 2cwts. superphosphate per acre.

"As can be clearly seen from the plan of cropping as set out above, after the first year only one field would be sown with lucerne and one with rye grass and clover each season, and the lucerne would remain on each field for four years, then be ripped up and carry the rye grass and clover for two years before lucerne was again sown.

"The manure would be applied to the land any time after the soil was cultivated, and the seed of both lucerne and the mixture would be broadcasted as soon after the first rain in the autumn as was possible."

TOBACCO CULTURE.

ACTIVITIES IN VICTORIA.

The Field Officer of the Department of Agriculture (Mr. S. B. Opie) recently paid a visit to Victoria for the purpose of acquainting himself with details of tobacco growing, and more especially in relation to curing as practised in that State. He was courteously received by officers of the Victorian Department of Agriculture, Mr. T. J. A. Smith (Tobacco Expert) and Mr. G. E. Marks (Assistant Tobacco Expert), and was given the opportunity of visiting a number of the principal tobacco areas in that State. In the course of a report supplied to the Director of Agriculture on his return to Adelaide, Mr. Opie said, *inter alia*:—"In the Ovens Valley are the towns of Bright and Myrtleford, the centres of the chief tobacco-growing districts of Victoria. Bright is situated at the head of the valley and Myrtleford some 15 miles lower down. This valley, running past the foot of Mount Buffalo, consists of sandy river flats, overlying a coarse river wash, with the River Ovens supplying water for irrigation, when necessary. Much of these flats in the past has been dredged for gold, and this has disturbed the soil from the agricultural view point; nevertheless, very fine areas remain. It is on these areas that tobacco is being cultivated. Other crops popularly grown here are maize for corn, broom millet, hops, &c. In company with Mr. Marks and Mr. Howell (who is adviser for the British Australian Tobacco Company in the growing and curing of the tobacco crop), I visited one of the best and largest tobacco-growers in Victoria. This gentleman, Mr. Macnamara, owns a large area of these river flats. On these, maize has been a popular crop, but the returns from this crop are only about £10 per acre, although it grows to a height of 10ft. and 12ft. Last year this grower had some 30 acres of tobacco which he harvested. He obtained 12 tons of cured leaf, which sold for an average price of 2s. 4d. per lb., returning over £100 per acre. His best leaf brought 3s. per lb. This year, unfortunately, blue mould has reduced the crop considerably, attacking the plants in the field. This grower mentioned that he found no more payable crop than tobacco, nor one so easily produced when guided by experience.

"Other growers were met, who had not such fortunate experience with the cultivation of tobacco, brought about probably by insufficient knowledge of the district and the crop.

"Tobacco growing in the Stawell area is being conducted on a totally different kind of soil from that growing tobacco in the Ovens Valley district. The locality is situated at the foot of the Grampian Mountains, some 14 miles south-west of Stawell. This soil is of a very sandy nature, similar to some soil found at McLaren Flat in this State. It is here that great hopes are being realised for the production of the lemon-yellow leaf. It is necessary here to manure very heavily, using up to from 6cwts. to 7cwts. of super per acre. I was able to examine some of the cured leaf, and it was of a fine texture, not having the coarse feeling of tobacco grown on heavier ground."

£10 10s. CLEAR PROFIT

From 15 back yard fowls Thanks to Karswood Poultry Spice



Week in and week out new users are coming to realise the value of Karswood Poultry Spice. Steadily the great army of constant users now more than 500,000 strong) is being added to. Almost daily we receive letters from successful backyard poultry keepers. Each one has a message for YOU.

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£10 10s. CLEAR PROFIT.

"Mahnoo," 5, Federal Avenue,
Ashfield, March 19th, 1924.

Dear Sirs- I am sending you some results from feeding with Karswood Spice. I commenced feeding with Karswood last February (1923), and the effect was quickly noticeable.

I started with seven White Leghorns and seven Black Orpington pullets, and one old Black Orpington hen, and no rooster From February 8th to February 8th this year they laid 2,565 eggs, or an average of 171 eggs each for 12 months, the highest production was 310 for one month, and they showed a profit of £10 10s. Facts speak for themselves.

(Signed) P. VEEVERS.

INCREASED EGG SUPPLY.

9, Falcon Street, Parnell,
Auckland, N.Z., March 23rd, 1924.

Dear Sirs—I have been keeping poultry for about four months and have used your Spice for about three months and would not be without it, as it keeps the birds in good health and increases the size and number of eggs.

(Signed) MRS. LOADER.

25 A DAY FROM 29 HENS.

243, Riversdale Road, Auburn,
December 4th, 1923

Dear Sirs- I have been using Karswood Poultry Spice for some time and find the results everything to be desired, and have recommended it to quite a number of poultry breeders. At present I have 29 hens and have an average of 22, 23, and 25 eggs a day since using your spice

(Signed) MISS L. DURRAU

MAKES THEM LAY THROUGH WINTER.

T J Sharpless, Box 15,
Manildra, March 3rd 1924.

Please forward me four packets of Karswood Poultry Spice—the pound packets I think they are. I used it last year, and I got some from you for my neighbors, and they all say it is very good, especially this time of the year to help the hens over the moult. I was a bit afraid at first that it might do the hens harm, but it does not seem to hurt them; it makes them lay big eggs and more of them. It is also very good to make them lay through winter

(Signed) T. J SHARPLESS.

MAKE THIS TEST—

Go to your local grocer, storekeeper, or produce dealer. Get a 1s. packet of Karswood Poultry Spice. Test it for a fortnight on half a dozen hens. Do not expect an immediate avalanche of eggs. Karswood works naturally, not suddenly. Within a fortnight or three weeks you will notice a decided improvement in the health, virility, and productiveness of the Karswood birds.

NOTE THE ECONOMY.

1s. packet supplies 20 hens 16 days.
2s. packet supplies 30 hens 32 days.
13s. tin (7lbs.) supplies 140 hens 32 days
14lbs. tins, 25s. 28lbs. tins, 48s.

Makes 12 Hens Lay for ½d. a Day.

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KARSWOOD POULTRY SPICE

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ORCHARD NOTES FOR SOUTHERN DISTRICTS.

[By C. H. Beaumont, Orchard Instructor and Inspector.]

Have you had a look at the fruit in the cool store? Have you asked that it be examined? If you have not, you are courting disaster. Having the fruit in the store is not a guarantee that it will keep good indefinitely; a very great deal depends on its condition when sent to the store, so go through it, handle the fruit very carefully, realise on the mature fruit, and repack only the most fit. Get on with the pruning; heap up the cuttings as you go. It is impossible to give instructions here, but you have an instructor in your district; send for him, or go to the State Experiment Orchard, at Blackwood, or Hackney Road, City, and have methods demonstrated to you. The principle of pruning is to form the young tree, and afterwards to ensure a supply of bearing wood. Do not prune sick trees with the others, leave them until last; trees affected with woolly aphis should be dealt with in a similar way.

Where woolly aphis has been a nuisance, give the trees a thorough wash with a crude petroleum emulsion; it is cheap, it is effective. It will also help to rid the trees of red spider by destroying the eggs.

Plough as early as you can; plough to the trees, thus leaving a furrow along every row; this will do away with surplus water without damage or much loss of soil; plough lightly near the trees, and as deeply as you can when away from them. Leave the soil in the clod until the second ploughing.

It is absolutely necessary to keep water from lodging about the trees, especially citrus. Get on with planting; do not plant any weaklings, send them back to the nursery. Growers of celery should rake up all waste for burning or to be deeply buried, in this way they may control the rust to a great extent.

Hunt up all the codlin left in the orchard; take away old bandages; remove loose bark; dig out all the rotten wood; and remove any rubbish left about the trees.

On wet days have a thorough clean up of the packing shed, and dip used cases in boiling water.

Do not waste olives; pickle them or make oil. Write to the department for methods if you do not know how to go about it.

STERILITY IN CATTLE.

[By A. H. Robin, B.V.Sc.]

Sterility, or failure in cows to stint, may be absolute or permanent —where reproduction is impossible at all times, or temporary, where reproduction occurs irregularly. Many causes exist to produce either one of these conditions, some being direct, others indirect causes. The most common are:—

(1) *Contagious Abortion.*—This is one of the most prevalent causes operating. It is probably indirectly responsible for 50 per cent. of the cases of sterility in cattle. In herds affected with contagious abortion, sterility is much more prevalent than in herds free from the disease. The presence of this infection, which in the pregnant animal locates itself in the uterus or breeding bag, causes abnormal changes to take place in that organ, so that after aborting or calving at the normal time, it is more liable to be subject to further secondary infection, as the result of which the cow does not become stinted again for varying periods, and only after a considerable amount of treatment. Sometimes it may never breed again.

As a rule, when cows are affected with contagious abortion, when the calf is slipped or is dropped at the normal time, as is often the case, the membranes are retained, and have to be manually removed. There is also present a considerable amount of dirty, brown, yellow, jelly like discharge, which persists for several weeks, even under suitable treatment. Until this discharge ceases, the cows fail to get in calf again even though they may be returned to the bull time and time again. This contagious abortion disease is more prevalent than cow owners will admit, and every case of abortion (in particular) should be looked upon with suspicion, and treated accordingly.

(2) Where contagious abortion is not present to carry on its evil work, the general septic infection that occurs after almost every normal calving is a potent factor in the production of a subsequent sterility. If early and careful attention is given, it is usually readily amenable to treatment, but if neglected, permanent sterility will often ensue, and every cow after calving should be treated with antiseptic douching, either to act as a preventive of infection occurring, or to arrest it promptly if it has happened. If cow owners would more commonly carry out this simple measure, it would result in a considerable diminution of the number of cows that do not readily get in calf when returned to the bull. Irrigation of the breeding bag and vagina should be carried out at the most, within a day or two of calving, and continued daily, or every second day, until the discharge ceases. Hot Condy's solution is very effective, but it must be

used very weak. The great fault with those who use it is that they use it far too strong. The solution should be only of a faint pinkish tinge, and not the color of strong tea, four or five crystals to a bucketful of water is sufficient. Another safe and effective remedy is the use of a hot normal saline solution, which every cow owner can readily make up in his own home by using one teaspoonful of common salt to each pint of water.

(3) Any other condition causing inflammation of any part of the genital tract may act as a cause of sterility. A fairly common lesion is a granular inflammation of the back passage (vagina), and this, if present, must be treated and reduced, after which the cows will usually get in calf again. Antiseptic irrigation is suitable treatment, but the solution must be weak, so as not to cause irritation. Use 1 per cent. warm solution of lysol until excessive sensibility disappears, and then use solutions of zinc sulphate 75 grains to the pint.

(4) Misplacement of genital organs, injury and hardening of the neck of the breeding bag (which often happens as the result of wounding during the act of calving), disease of the ovaries, &c., are all causes of sterility. These are conditions which can only be handled under expert supervision.

(5) Old age and constitutional disease also play their part in the production of sterility.

(6) Acidity of the normal vaginal secretions is a condition which frequently operates against stinting cows, by having a damaging effect on the male germ after it has been deposited in the female genital passage by the bull. This acidity, if present can suitably be treated by douching with a solution of bi-carbonate of soda shortly before the cow goes to service.

(7) These are the most common causes of sterility in cows, and a thorough examination must always be made of the female genital organs in an endeavor to arrive at the cause operating, and to determine suitable treatment. I have mentioned, wherever possible, suitable treatment which can readily be undertaken by cow owners in an endeavor to set things right. Beyond these few remedies suggested, it becomes a matter for an expert veterinary surgeon only to handle the case effectively. Even with these simple remedies, care must always be exercised in handling them, otherwise a simple case of temporary sterility may be turned into a case of permanent sterility. Feeding cows on a diet overrich in protein, with a small quantity of rough herbage, is a factor which predisposes to sterility, and the cause suggests its own remedy. This practice is sometimes adopted by dairymen for the purpose of causing heavy milk production, and in preparing cattle for show purposes.

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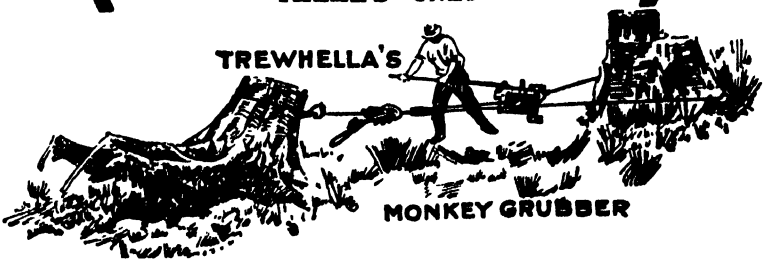
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SHEEP AND STINKWORT.

"Farmers know that the stinkwort is the direct cause of the deaths," writes the Hon. Secretary of a Branch of the Agricultural Bureau, by way of preface to the following questions recently submitted:—"Why does stinkwort kill ewes in lamb and hoggets more readily than the general flock? Why does the stinkwort cause death?"

To these queries Mr. A. H. Robin, B.V.Sc., writing on behalf of the Stock and Brands Department, replies:—There is much yet remaining to be cleared up in connection with this vexed question of stinkwort poisoning in sheep. We agree with the sheepowner that this weed is responsible for an annual loss in his flocks (possibly a considerable loss at times), but are not over ready to agree with the common idea prevailing in his mind that the loss is due to poison in the plant. There is a poisonous principle contained in the weed—that fact is definitely established by chemical analysis—and it is also an established fact that if this poisonous principle is given to sheep in large quantities and repeatedly, it will produce serious effects. But this poison is found to be present in the plant only in small quantities, and this fact would seem to work against the idea of death being due to its specific poisonous effects, for the animal would have to eat an enormous amount of the natural plant in order to absorb out of it sufficient amount of poison to anything like approach the large amounts experiments have shown to be necessary to induce the untoward effects. Certainly the poisonous principle taken in with the plant in small quantities by grazing the animals on it, may play a part. It would seem more probable that the ingestion of the plant would result in serious digestive upset, as a result of which, secondary conditions present in the animals' bowels—such as bacterial infection—would have the way opened up to produce that morbid condition, which is the actual cause of death—the weed being only the primary contributory cause. Ewes in lamb and young hoggets would, to some extent, be more prone to digestive disturbance than matured males and adult empty ewes. We have noticed instances, though, where stinkwort appeared to be the factor primarily operating to cause loss of animals of both sexes of all ages, and both pregnant and empty ewes. We do not agree with sheepowners in their more or less dogmatic opinion that their losses are so often due to stinkwort, but are certain that in many instances the losses are due to some other distinct morbid condition which has not been recognised—or for which it has been mistaken—and wrongly ascribed to stinkwort. (That which at times seems most apparent is not always correct). Much loss in sheep is due annually in this State to a braxy-like disease a specific bacterial disease—the symptoms of which are very often wrongly attributed to stinkwort, as they in many ways simulate those symptoms which are generally accepted as being symptoms of the latter. Unfortunately, we are not able to give anything definite statistically as to the prevalence of this braxy-like disease, due to the fact

that so many of the losses in sheep are not officially reported or recorded, and the opportunities offered thereby for investigational work lost. Pregnant ewes are subject to a morbid condition confined to them and known as pre-parturient toxaemic paralysis, which manifests itself in animals heavy in lamb, and usually carrying twin lambs. Again, the symptoms of this condition resemble very much those symptoms considered by most sheepowners to be stinkwort trouble, and give rise to further instances of mistaken identity. Erroneously attributing deaths in this way to be due to stinkwort might engender the idea which is commonly amongst sheepowners—that stinkwort is more prone to attack ewes in lamb than other individuals of the flock, particularly empty ewes. Through similarity of the general symptoms usually observed by the average stockowner, nearly all losses of sheep in a district may be attributed by him to being due to one and the same cause, whereas the several distinct conditions mentioned may all, or at least more than one of them, be operating.

GLENCOE HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR APRIL, 1924.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat		
			Per Herd during April	Per Cow during April.	Per Cow October to April	Per Herd during April.	Per Cow during April.	Per Cow October to April.
			Lbs.	Lbs.	Lbs	Lbs.	Lbs.	Lbs.
3/A	17	16·70	10,767	633·35	5,556·83	473·53	27·85	232·94
3/B	16	15	5,580	348·75	2,719·77	230·04	14·38	119·21
3/C	12	8	4,170	347·50	4,674·10	191·18	15·93	187·78
3/D	11	9	6,315	574·09	4,088 62	252·66	22·97	157·72
3/E	14·23	10·60	8.196	575·96	4 276·09	371·80	26·13	181·50
3/F	9	8	2.970	330·00	4.222·42	141·03	15·67	173·53
3/G	13	10·67	6,245	480·38	4,756·35	246·03	18·93	179·18
3/H	16	14·80	4,820	301·25	3,836·55	209·05	13·07	149·30
3/I	14	14	7,200	514·28	4,106·13	312·95	22·35	172·41
3/J	16·07	14·60	4,875	303·18	2,860·42	247·52	15·40	130·52
3/K	22	20·47	8,951	406·86	3.981·45	397·08	18 05	168·29
3/L	22 93	10·97	5,811·5	253·44	3,479 40	250·01	10·90	142·88
3/M	15	11·63	3.690·5	246·03	3,464·54	171·16	11·41	149·57
3/N	20	16·23	7,816	390·80	3,723 54	352·13	17·61	159·65
3/O	17	15	4,605	270·88	3,524·33	229·11	13·48	131·86
3/P*	13·33	13·33	3,901	292·64	2,422·64	182·13	13·66	92·79
3/Q	60	52·27	16,487·5	274·79	3,655 76	784 60	13 08	150·71
3/R	18	15·90	7,290	405·00	4,589·22	351·71	19·54	198·48
Means	18·14	15 40	6,649·47	366·52	3.887·09	299·65	16·52	160·90

* Herd No. 3/P has only been under test for four months.

RIVER MURRAY HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1924.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during March.	Per Cow during March.	Per Cow October to March.	Per Herd during March.	Per Cow during March.	Per Cow October to March.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1/J	34·87	30	22,472·5	644·46	4,759·20	934·48	26·80	180·53
1/C	20	16	8,912·5	445·63	2,875·36	431·24	21·56	130·82
1/L	20	15·48	8,935·5	446·78	3,716·55	408·04	20·40	162·19
1/M	21·61	17·29	10,235	473·62	2,489 22	512·49	23·72	127 32
1/R	17·23	15·06	6,029	349·91	2,976·26	349·36	20·28	144·28
1/T	15	12·45	9,788	652·53	3,068·44	514·20	34·28	155·20
1/W	18	14·29	7,803	433·50	2,946·06	296·57	16·48	113·44
1/Y	19	16	10,416	548·21	3,618·20	509·58	26·82	166·49
1/Z	20·55	17·29	11,205	545·25	3,193·69	535·79	26·07	146·42
1/Dd	26	21·52	11,966·5	460·25	3,368·27	526·93	20·27	147·00
1/Ee	11·61	11·61	6,954	598·95	3,815·15	330·95	28·51	175·95
1/Ff	12·87	9·39	5,147	399·92	3,813·88	245·91	19·11	161·79
1/Gg	9	8·29	6,341	704·56	4,173·42	280·43	31·16	187·64
1/Hh	13	11·36	7,623·5	586·42	4,151·04	343·59	26·43	182·11
1/Ii	13	10·65	7,773·5	597·96	3,630·72	312·87	24 07	155·95
1/Jj	16	12·06	8,285·5	517·84	3,219·38	364·60	22·79	138·39
1/Kk	14	12	6,572	469·43	3,665 74	314·24	22·45	162·11
1/Ll	16·74	13·45	7,672	458·30	3,323·28	341·51	20·40	147·03
1/Mm	20	19	11,563	578·15	3,527·85	549·34	27·47	167·02
Means	17·81	14·90	9,247·07	519·07	3,479·92	426·43	23·94	153·29

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22, GRENFELL STREET - - ADELAIDE.

MOUNT GAMBIER AND DISTRICT HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR APRIL, 1924.

Herd No.	Average No. of Cows in Herd.	Average No of Cows in Milk	Milk.			Butterfat.		
			Per Herd during April	Per Cow during April.	Per Cow August to April	Per Herd during April.	Per Cow during April.	Per Cow August to April.
			Lbs	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
2/A	15	12·77	5,207	347·13	4,550·12	252·97	16·86	187·70
2/B	9	7 03	3,727·5	414·17	6,735 22	158 80	17 64	246·53
2/E	12	10 37	5,760	480·00	5,635 58	245·24	20·44	236·10
2/H	24 43	19·70	8,803	360 33	5,538 60	395·46	16·19	222·27
2/I	14	11·80	5,375	383 93	5,740 88	231·78	16·56	225·90
2/J	12	11·93	6,005	500·42	7,155 17	287·37	23·96	292·93
2/K	25	18	9,988	399·52	5,015 06	434·19	17·37	193·83
2/L	22	17·77	9,517	432·59	3,931·55	476·55	21·66	177·56
2/O	30	19·53	10,915	363·83	4,009·59	440 25	14·68	154·49
2/R	16·20	15·07	11,588	715·31	8,581·81	474·01	29·26	338·58
2/S	6	4·47	2,972	495·33	6,753 52	147·19	24·53	306·58
2/T	12	11·13	6,691	557·58	6,736·92	270·79	22·57	256·28
2/U	17	6 50	3,720	218·82	6,099 50	152·29	8·96	239·29
2/V	21	15	5,145	245·00	3,729·16	220·05	10·48	151·87
2/W	15·57	8 73	5,185	333·01	6,572 92	206·38	13·25	240·82
2/Y	12	10 53	5,909	492·42	6,506·05	258·50	21·54	262·79
2/Bb	9	8·83	3,225	358·33	4,663·94	142·76	15·86	180·79
2/Cc	13	10·27	2,680	206·15	4,034·81	135·13	10·39	174·16
Means	15·84	12 19	6,245·14	394·15	5,421·03	273·87	17·29	214 32

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ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Tuesday, May 13th, there being present Mr. W. S. Kelly (Chairman), Captain S. A. White (Vice-Chairman), Colonel Rowell, Messrs. C. A. Loxton, B.V.Sc. (Chief Inspector of Stock), A. Julius (Conservator of Forests), A. M. Dawkins, L. Cowan, B.Sc. (Agric.), A. B. Feuerheerdt, F. Coleman, C. J. Tuckwell, J. W. Sandford, P. H. Jones, H. S. Taylor, and the Secretary (Mr. H. J. Finnis). Apologies were received from Professor Perkins and the Hon. W. Duncan, M.L.C.

Welcome to New Member.—The Chairman (Mr. W. S. Kelly), on behalf of the members of the Board, extended a cordial welcome to Mr. A. Julius (Conservator of Forests), who had recently been appointed a member of the Advisory Board.

Michaelmas Holidays and the Spring Show.—It was decided that the Chairman of the Board should interview the Minister of Education and endeavor to have the date of the Michaelmas holidays altered to synchronise with the September Show.

Washed Super Bags for Marketing Potatoes.—At the recent Conference of South-Eastern Branches it was decided "That it be permissible to use good, sound, thoroughly washed super bags for marketing potatoes." On the motion of Mr. F. Coleman, seconded by Colonel Rowell, it was decided to transmit the resolution to the chairman of the Central Board of Health for comment.

Supplies of Forest Trees.—The South-Eastern Conference resolved "That the Government be asked to supply trees in unlimited quantities at cost price or a nominal charge, instead of distributing them free." Mr. F. Coleman moved, and Captain S. A. White seconded, that the words "in unlimited quantities" be struck out. This was carried, and in its amended form the resolution met with the strong support of the Board, who decided to recommend the Government to take action in the direction suggested.

Voluntary Wheat Pool.—The motion "That this Conference favors the continuance of the guarantee to the Voluntary Wheat Pool," carried at the recent Conference of South-Eastern Branches, was received.

Lectures to Bureaux on Bee-keeping.—A communication was received intimating that the writer thereof was prepared to deliver lectures on bee-keeping to Branches of the Agricultural Bureau interested in the bee industry. On the motion of Mr. Taylor, seconded by Mr. F. Coleman, the Secretary was instructed to ascertain whether certain Branches of the Bureau were desirous of securing instruction on this industry, and if so, to take the necessary steps to have their wishes fulfilled.

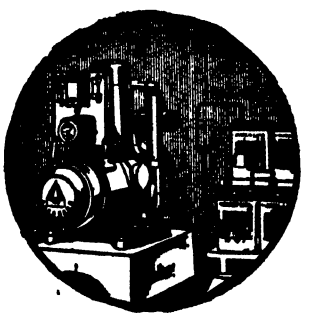
Appointment of Field Officer.—Mr. P. H. Jones moved, and Mr. F. Coleman seconded, "That the Minister of Agriculture be recommended to appoint a general field officer to the staff of the Department of Agriculture." **The motion was carried.**

Congress, 1924.—The Chairman of the Advisory Board (Mr. W. S. Kelly), the Director of Agriculture (Professor Arthur J. Perkins), the Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch), Mr. H. S. Taylor, and the Secretary (Mr. H. J. Finnis) were appointed a committee to deal with arrangements for the 1924 Annual Congress.

Life Membership.—The name of Mr. J. K. Bond, of the Tatiara Branch, was added to the roll of life members of the Agricultural Bureau.

New Branches.—Approval was given for the formation of Branches of the Agricultural Bureau at Gulnare and Karoonda, with the following gentlemen as foundation members:—*Gulnare*—B. W., A. G., and W. E. Thomas, D. A. and J. T. McLean, T. A. and E. E. Sandow, E. M. Davidson, E. Smart, L. H. and J. G. Teakle, H. G. Spackman, D. M. Hodge, A. C. Martin, A. J. Godlee, W. G. Allen, R. S. Booth, and C. N. Jones. *Karoonda*—E. H. Ridgley, G. H. Hicks, — Hawkes, I. Mickan, A. Thomson, E. Hoff, W. Hoff, A. Stevens, J. J. English, E. R. Miell, C. L. Venn, J. Cornford, H. Hart, L. J. Sandercock, A Walker, O. S. Burgan, and D. and F Laurie.

New Members.—The following names were added to the rolls of existing Branches:—Murray Bridge—A Patterson, C. J. Pearce. Aldinga—T. L. Battye, W. J. Pethick, L. J. Humphrys, B. Eatts, L H. Lovelock, W. E. Schultz. Darke's Peak—G. Cronin. Mypolonga—F. Scott, H. Prosser, E. Prosser. Kilkerran—E. Heinrich. Currency Creek—J. S. Green. Lyndoch—F. Hunt. Cygnet River—T. H. Waller. New Residence—R. Klitscher, M. Klitscher, G. Klitscher, E. Glatz. Tweedvale—J. S. Jantke, H. B. Leuders, O. A. Boerth, J. Boerth, A. O. Nagel, B. O. Reu. Brinkley—J. G. Such. North Booborowie—K. Hanlin. Parilla—A Earsman, C. Dabinett. Morchard—S. Mills. Kongorong—C. H. Johns Willowie—J. K. Linklater, C Stone, K. Stone, I. R. Starkey, W. G. Evans, N. H. Ridley. Tantanoola—I. L. McDourt. Kringin—J. C Werner, A. Herbert. Maltee—E. Richie Brentwood—E. J Treasure, H. Webb.



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IMPORTS AND EXPORTS OF FRESH FRUITS, PLANTS, ETC., DURING THE MONTH OF APRIL, 1924.

IMPORTS.

Interstate.

Apples (bushels)	79
Bananas (bushels)	9,843
Grapes (bushels)	2
Passion fruit (bushels)	141
Pineapples (bushels)	191
Cabbages (packages)	5
Cauliflowers (packages)	5
Mixed vegetables (packages)	1
Onions (bags)	547
Potatoes (bags)	18,521
Bulbs (packages)	59
Plants (packages)	51
Seeds (packages)	60
Trees (packages)	1
Wine casks, empty (number)	3,078
Pears (bushels)	4

Fumigated—42 wine casks and 1 package of fruit trees.

Rejected—18bush. of bananas, 8bush. of pineapples, 1bush. of apples, 2bush. of grapes, and 2 bags of potatoes.

Overseas.

3,228 packages of seeds, &c.

EXPORTS (*Overseas*).

33 packages of citrus fruit, 113,402 packages of other fresh fruit, 424,712 packages of dried fruit were exported to overseas markets. These were consigned as follows:—

London.

Apples (packages)	110,679
Pears (packages)	1,691
Quinces (packages)	6
Dried fruit (packages)	422,262

New Zealand.

Dried fruit (packages)	1,469
Citrus fruit (packages)	33

South Africa.

Dried fruit (packages)	895

Port Said.

Apples (packages)	302

India and East.

Apples (packages)	654
Dried fruit (packages)	86
Grapes (packages)	70

THE AGRICULTURAL OUTLOOK.

REPORTS FOR THE MONTH OF MAY.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective Managers:—

Booborowie.—Weather—The weather for May has been ideal in this locality from the point of view of farming and feed growing, 159 points of rain having been registered, which fell during 10 days in small quantities. Crops—There is very little to be seen up to the time of writing in the way of cereal crops. The lucerne is at a standstill, which is only natural for this time of the year. Natural feed—There is an abundance of natural feed just now. Stock—Livestock are all in good condition. Pests—There are no pests worth mentioning. Miscellaneous—Farmers are busy with their seeding.

Kybybolite.—The weather has been comparatively calm, with a preponderance of cold, frosty nights and fine, warm days, interspersed with light rains. One hundred and fifty-four points of rain have been registered, which is 1in. below the average for May. The total of 7¼in. for the year is over an inch above the average for the first five months of the year. Crops—Winter cereals have had a splendid opening for their season, and practically all hay, wheat, and oat crops have been sown, and under good soil conditions. Crops have germinated well and made really good initial growth. Large areas of subterranean clover have been sown, and these have also germinated well. The frosts have helped materially to ripen off the maize grown for grain under irrigation, and some varieties are now ready for harvesting. Natural feed—Growth of feed was considerably checked by the somewhat dry frosty weather received earlier in the month; but the rains received later have caused an improved growth.

Turretfield.—Weather—The earlier portion of the month was dry. Rain started on May 15th, and continued for about a week. This was followed by fine days with frosty mornings; 187 points of rain were registered. Crops—A considerable area has been sown; that sown dry before the rain is up and giving a nice green color to the fields. Natural feed—There is little natural feed; the frosts have checked the growth. Stock are in only fair condition; several nice lots of early lambs are to be seen. Pests—Foxes and eagle hawks have done some damage to the lambs. Miscellaneous—A larger area should be sown this year in the district.

DAIRY AND FARM PRODUCE MARKETS.

A. & W. Sandford & Co., Limited, reported on June 2nd, 1924:—

BUTTER.—During the month under review several fluctuations in values with all grades of butter have taken place in sympathy with the markets of the Eastern States, especialy Victoria, from which State heavy importations of choicest qualities are being made so as to supply the trade's requirements. There has been a fair surplus of first, second, and third grade bulk butters which have been difficult to dispose of, although fairly good demand has been ruling on the local market for these grades. Choicest factory and creamery fresh bulk butter, 1s. 5½d.; first grade bulk, 1s. 3½d.; second and third grade, 1s. 0½d. to 1s. 1d.; best separators and dairies, 1s. 4d. to 1s. 5½d.; fair quality, 1s. 2½d. to 1s. 3½d.; store and collectors, 1s. 0½d. to 1s. 2½d.

EGGS.—Values throughout have been stationary, only an advance of 1d. per dozen taking place since the beginning of last month. At each sale, fairly substantial quantities were marketed and readily absorbed by interstate purchasers, especially New South Wales. Fresh hen, 2s.; duck, 2s. 1d. per dozen.

CHEESE.—The usual shrinkage in supplies has taken place with consignments of new makes from the South-Eastern factories, with the result that values improved. Buyers have been purchasing keenly for newly made cheese, the matured lines, of which heavy stocks are held, being neglected. At the last market in the month values receded ½d. per lb., due to the lower interstate quotations. New makes, 10d. to 11½d. per lb. for large to loaf; semi-matured and matured, large size, selling from 11d. to 11½d. per lb.

HONEY.—Apart from the fair local trade, big shipments have been made to the interstate purchasers which have kept consignments cleared, and as forwardings of the choicest liquid qualities were not equal to the demand, more attention has been paid to the lower grades, with the result that they have been moving more freely. Values are as follows:—Prime clear extracted in liquid condition, 5½d. to 5½d.; best quality candied lots, 5d.; lower grades, 2½d. to 3d.; beeswax readily saleable at 1s. 4d. to 1s. 4½d. per lb.

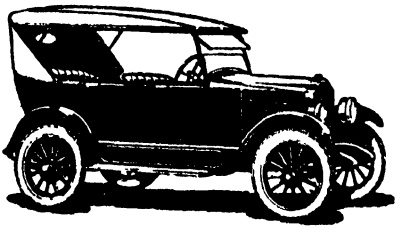
ALMONDS.—For some time past there has been a lack of interstate inquiries, and, as only moderate sales have been effected with local dealers, values have eased, rates being as follows:—Brandis, 7½d. to 8d.; mixed softshells, 6½d. to 7d.; hardshells, 3½d. to 4d.; kernels, short of demand at 1s. 7½d. to 1s. 8d.

BACON.—Good turnover has been experienced with this line, local supplies being hardly equal to this State's requirements, and several shipments from Victoria and New South Wales have been handled on this market. To-day prices recorded a lowering, values being as follows:—Best factory cured sides, 1s. 3d. to 1s. 3½d.; middles, 1s. 7d. to 1s. 7½d.; rolls, 1s. 3d. to 1s. 3½d.; Hutton's "Pineapple" brand hams, 1s. 8d. to 1s. 9d.; Hutton's "Pineapple" brand middles, 1s. 7½d.; lard, Hutton's "Pineapple" brand lard in packets, 1s.; in bulk, 11d. per lb.

LIVE POULTRY.—Fairly extensive catalogues have been submitted during the period, but supplies have not been equal to the demand, and this brought about an advance in values. The majority of the consignments were composed of fairly well-conditioned birds, and most satisfactory prices have been secured for these. but where light sorts were offered prices according to size and quality were realised. Good quality turkeys continue to be scarce. We advise forwarding consignments. Crates obtainable on application. The following rates ruled at our last auction:—Prime roosters, 5s. to 6s. 6d. each; nice conditioned cockerels, 3s. 3d. to 4s. 9d.; poor conditioned cockerels, 2s. 6d. to 3s.; plump hens, 3s. 6d. to 5s.; medium hens, 2s. 9d. to 3s. 3d.; some pens of weedy sorts lower; geese, 6s. 3d. to 7s.; ducks, good condition, 4s. 9d. to 6s.; ducks, fair condition, 3s. 6d. to 4s. 6d.; turkeys, good to prime condition, 1s. 0½d. to 1s. 4d. per lb. live weight; turkeys, fair condition, 10½d. to 11½d.; turkeys, fattening sorts, lower; pigeons, 8d. each.

POTATOES.—Prime new locals and Victorian potatoes at 6s. 6d. to 8s. 6d. per cwt. on rail, Mile End.

ONIONS.—Best brown onions at 12s. 6d. to 13s. 6d. per cwt. on rail.



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RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of and to the end of May, 1924, also the average precipitation to the end of May, and the average annual rainfall.

Station.	For May, 1924.	To end May. 1924.	Av'ge To end May.	Av'ge. Annual Rainfall
Far North and Upper North.				
Oodnadatta		1·43	2·46	4·04
Marree		1·26	2·48	6·07
Farina		1·22	2·85	6·66
Copley	--	1·26	3·59	8·39
Beltana	0·02	0·73	3·75	8·97
Blinman	0·10	1·33	4·89	12·53
Tarcoola	0·07	2·14	2·95	7·74
Hookina	0·58	1·44	4·47	13·46
Hawker	0·36	1 46	4·25	12·92
Wilson	0·24	1·89	4·20	12·58
Gordon	0·22	2·13	4·01	11·55
Quorn	0·36	2·45	4·61	14·21
Port Augusta	0·15	3·40	3·77	9·67
Port Augusta West	0·13	3·04	3·55	9·71
Bruce	0·15	2·33	3·58	10·77
Hammond	0·29	2·92	4·20	11·91
Wilmington	0·65	4·99	5·95	18·29
Willowie	0·48	3·51	4·40	12·57
Melrose	1·39	6·67	7·58	23·40
Booleroo Centre	1·41	4·90	5·00	15·65
Port Germein	1·23	5·09	4·69	12·89
Wirrabara	1·43	6·06	5·68	19·78
Appila	0·92	6·73	4·78	15·00
Cradock	0·22	1·48	2·92	11·52
Carrieton	0·39	2·91	4·21	12·90
Johnburg	0·21	2·40	3·66	10·91
Eurelia	0·24	2·33	4·49	13·54
Orroroo	0·64	2·59	4·75	13·73
Nackara	0·30	1·80	4·48	11·99
Black Rock	0·65	2·87	4·44	12·75
Ucolta	0·18	1·89	4·15	12·04
Peterborough	0·64	3·56	4·63	13·53
Yongala	1·04	4·54	4·62	14·58
Lower North-East.				
Yunta	0·13	1·12	3·55	8·88
Waukaringa	0·21	1·82	3·25	8·54
Mannahill	0·27	1·11	3·44	8·67
Cockburn	0·07	1·82	3·30	8·31
Broken Hill, N.S.W.	0·08	1·43	3·87	9·98
Lower North.				
Port Pirie	1·01	5·43	4·84	13·55
Port Broughton	1·05	5·45	4·79	14·29
Bute	1·62	5·93	4·99	15·78
Laura	1·87	5·50	5·63	18·26
Caltowie	1·28	5·66	5·44	17·20
Jamestown	1·55	6·76	5·35	17·89
Bundaleer W. Wks.	1·43	8·09	5·19	18·99
Gladstone	1·49	7·56	5·10	16·29
Crystal Brook	1·58	7·58	5·13	15·95
Georgetown	1·63	7·60	5·92	13·55
Narridy	1·34	5·20	5·33	16·37
Redhill	1·60	5·43	5·43	16·64

Station.	For May, 1924.	To end May, 1924.	Av'ge To end May.	Av'ge. Annual Rainfall
Lower North—*continued.*				
Spalding	1·37	6·82	5·59	20·27
Gulnare	1·79	8·29	5·41	19·36
Yacka	1·47	7·32	4·71	15·48
Koolunga	1·33	6·24	4·92	15·89
Snowtown	1·67	6·11	5·05	16·07
Brinkworth	1·16	6·06	4·73	16·30
Blyth	1·38	7·63	5·55	17·03
Clare	2·36	10·06	6·63	24·68
Mintaro	2·31	7·87	6·69	23·57
Watervale	2·40	9·59	8·37	27·54
Auburn	2·23	6·96	7·72	24·35
Hoyleton	1·36	5·98	5·68	17·91
Balaklava	1·91	5·50	5·54	15·95
Port Wakefield	1·01	5·80	5·04	13·28
Terowie	0·98	3·58	4·45	13·82
Yarcowie	0·87	3·55	4·70	14·22
Hallett	1·97	6·42	4·86	16·49
Mount Bryan	1·57	7·17	4·76	16·81
Kooringa	1·82	6·42	5·60	18·09
Farrell's Flat	1·49	6·44	5·80	19·00
West of Murray Range.				
Manoora	1·68	6·29	5·68	18·93
Saddleworth	1·96	6·04	6·45	19·78
Marrabel	2·09	6·38	6·09	19·76
Riverton	2·53	6·93	6·68	20·79
Tarlee	2·63	6·83	5·87	17·93
Stockport	2·11	6·49	5·28	16·63
Hamley Bridge	1·95	7·55	5·41	16·59
Kapunda	2·63	7·64	6·48	19·89
Freeling	1·90	5·88	5·71	17·99
Greenock	2·65	7·10	6·62	21·68
Truro	2·75	7·13	6·19	20·20
Stockwell	2·93	7·33	6·25	20·32
Nuriootpa	1·93	5·82	6·35	21·00
Angaston	2·71	7·04	6·82	22·53
Tanunda	2·27	6·61	6·95	22·24
Lyndoch	2·86	7·76	6·64	22·93
Williamstown	2·95	7·24	7·88	27·48
Adelaide Plains.				
Mallala	2·60	7·51	5·52	16·72
Roseworthy	2·15	6·55	5·54	17·35
Gawler	2·17	7·67	6·37	19·11
Two Wells	2·21	7·31	5·36	18·88
Virginia	2·29	6·69	5·66	17·32
Smithfield	2·51	7·51	5·47	17·24
Salisbury	2·23	7·98	6·19	18·51
North Adelaide	3·12	11·53	7·02	22·37
Adelaide	2·43	9·29	6·94	21·08
Glenelg	1·86	7·15	5·97	18·45
Brighton	1·92	7·49	6·64	21·37
Mitcham	3·27	8·72	7·45	24·26
Glen Osmond	3·39	9·52	7·99	25·94
Magill	3·02	12·18	7·16	25·35

RAINFALL—*continued.*

Station.	For May, 1924.	To end May, 1924	Av'ge To end May.	Av'ge Annual Rainfall
Mount Lofty Ranges.				
Teatree Gully	4·48	12·03	8·69	27·77
Stirling West	4·66	16·82	11·92	46·82
Uraidla	5·84	16·03	13·07	44·23
Clarendon	3·38	10·71	10·33	33·09
Morphett Vale	3·10	10·17	7·38	22·90
Noarlunga	3·10	10·28	6·51	20·41
Willunga	4·26	11·16	8 20	25·09
Aldinga	3 66	8 86	6·42	20·44
Myponga	3·14	10·69	8·49	29·80
Normanville	3·77	9·40	6·57	30·70
Yankalilla	3·30	9 33	7·44	23·31
Mount Pleasant	3·50	7·60	7·89	27·28
Birdwood	3 58	7·99	8·30	29·39
Gumeracha	4·79	11·78	9 78	33·36
Millbrook Reservoir	5 20	13·18	10 33	36·21
Tweedvale	5 49	12·48	9·80	35·65
Woodside	4 74	11·00	8 92	32·20
Ambleside	4·42	11·94	9·74	34·82
Nairne	4·05	10·11	8·50	28·44
Mount Barker	3 41	10·00	9·38	31·30
Echunga	4·42	11·40	10 11	33·06
Macclesfield	3·78	9 67	8·92	30·65
Meadows	4·96	14·60	10 72	36·19
Strathalbyn	2·25	7 80	6 24	19·37
Murray Flats and Valley.				
Meningie	2·23	8·91	6·18	18·74
Milang	1·39	6·07	5·13	15·45
Langhorne's Creek	1·86	6·64	4·77	14·77
Wellington	2 35	6·94	4 81	14·80
Tailem Bend	2·28	7·24	4·99	14·68
Murray Bridge	1·94	5·85	4·81	13·94
Callington	1·73	5·72	5·04	15·49
Mannum	1·19	4·60	4·24	11·66
Palmer	1·57	3·82	4·65	15·46
Sedan	1·65	3·82	4·10	12·27
Swan Reach	1·36	3·94	3·75	11·06
Blanchetown	0·79	3·23	3·81	10·09
Eudunda	1·21	4·15	5·44	17·51
Sutherlands	0·73	3·22	3·43	11·20
Morgan	0·47	3·17	3·23	9·30
Waikerie	0·54	3·90	3·54	9·87
Overland Corner	0·30	2·80	4·03	11·03
Loxton	0·58	3·79	4·50	12·50
Renmark	0·49	3·04	3·87	11·06
Monash	0·49	3·43	--	—
West of Spencer's Gulf.				
Eucla	0·45	1·63	4·37	10·01
White Well	—	2·73	3·20	9·20
Fowler's Bay	1·18	3·12	4·04	12·14
Penong	1·47	4·98	4·27	12·53
Ceduna	0·79	2·83	2·29	10·25
Smoky Bay	1·03	2·64	3·49	10·98
Petina	1·21	3·12	3·87	12·95
Streaky Bay	2·17	3·98	4·51	13·07

Station	For May, 1924.	To end May, 1924.	Av'ge To end May.	Av'ge Annual Rainfall
West of Spencer's Gulf *continued.*				
Talia	1·73	3 07	3·86	15 32
Port Elliston	2·89	5 44	4·49	16·56
Cummins	2·13	3 74	4·12	18·56
Port Lincoln	2·07	4 76	5·78	19·66
Tumby	1·88	2·93	4·06	14·56
Carrow	1·45	2·58	4 19	14·42
Arno Bay	1 16	2·05	4·11	13·06
Cowell	0·32	2 69	4·40	11·63
Minnipa	0 97	3·45	4 89	15·51
Yorke Peninsula.				
Wallaroo	1 06	5 68	5·09	14·15
Kadina	1 01	6 25	5·48	16·02
Moonta	1·34	6·75	5·43	15·35
Green's Plains	1·37	5·77	5·04	15·86
Maitland	1·68	9·30	6·48	20·17
Ardrossan	1 23	4·94	4·69	14·18
Port Victoria	2 07	6 41	5·17	15·50
Curramulka	2 22	6·22	5·54	18·20
Minlaton	2 84	6·34	5·55	17·90
Brentwood	1 99	5·66	4 85	15·83
Stansbury	2·40	6·04	5·34	17·01
Warooka	1·79	5·32	5·42	17·80
Yorketown	1 76	5 77	5·25	17·24
Edithburgh	2 04	5 76	5·38	16·58
South and South-East.				
Cape Borda	3·47	7 84	7 23	25·08
Kingscote	2·81	4·93	5·79	19·04
Penneshaw	2 24	5·19	5 31	19·47
Victor Harbor	2·36	6·81	6·77	21·49
Port Elliot	2·53	6·98	6·50	20·12
Goolwa	1·59	5·82	5·97	17·89
Pinnaroo	1·20	4·86	5·26	15·50
Parilla	1·32	4·56	4·44	14·51
Lameroo	1·51	6·77	5·03	16·32
Parrakie	1·57	5·64	4·45	14·58
Geranium	2·01	6·77	4·97	16·62
Peake	2·74	8·54	5·31	16·73
Cooke's Plains	2·65	8·40	4·69	15·14
Coomandook	2·53	8·30	5·28	17·49
Coonalpyn	2·25	9·04	5·27	17·40
Tintinara	2·06	8·46	5·61	18·70
Keith	2·09	7·88	5·55	18·22
Bordertown	1·39	8·08	5·86	19·39
Wolseley	1·53	7·76	5·43	18·12
Frances	2·03	7·57	5·78	19·73
Naracoorte	1·90	8·90	6·64	22·25
Penola	2·26	8·75	7·92	26·26
Lucindale	2·43	10·28	6·58	23·00
Kingston	2·63	9·64	7·34	24·51
Robe	2·72	8·18	7·33	24·69
Beachport	2·57	7·48	8·05	27·20
Millicent	3·17	11·23	8·94	29·39
Kalangadoo	2·88	12·83	8·57	32·47
Mount Gambier	2·30	10·27	9·62	31·29

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS

Branch	Report on Page	Dates of Meetings	
		June.	July.
Alawoona	*	—	—
Aldinga	1116	18	16
Allandale East	1117	20	18
Amyton	*	16	14
Angaston	*	—	—
Appila-Yarrowie	*	—	—
Arthurton	‡	—	—
Ashbourne	*	—	—
Balaklava	*	14	12
Balhannah	*	6	4, 25
Barmera	1102	16	14
Beetaloo Valley	*	16	—
Belalie North	*	14	12
Berri	1102	18	16
Bethel	1078	—	—
Big Swamp	‡	—	—
Blackheath	1103, 1116	20	18
Black Springs	1078	17	15
Blackwood	1116	16	21
Block E	*	—	—
Blyth	*	7	5
Booleroo Centre	*	14	12
Borrika	*	—	—
Brentwood	1082	12	10
Brinkley	1094	14	12
Brinkworth	1077	—	—
Bundaleer Springs	*	—	—
Bute	*	17	15
Butler	‡	—	—
Calca	*	—	—
Cadell	*	—	—
Canowie Belt	*	—	—
Carrow	*	11	16
Cherry Gardens	1116	17	—
Clanfield	*	—	—
Clare	*	—	—
Clarendon	‡	16	14
Claypan Bore	*	18	16
Cleve	*	11	16
Collie	*	21	—
Colton	*	27	25
Coomandook	1102	11	16
Coonalpyn	1103	20	18
Cradock	*	—	—
Crystal Brook	*	14	12
Cungena	*	—	—
Currency Creek	1116	20	18
Cygnet River	1104	12	10
Darke's Peak	1085	—	—
Denial Bay	*	—	—
Edillilie	‡	28	26
Elbow Hill	*	17	22
Eurelia	1074	14	12
Farrell's Flat	1079	13	11
Frances	‡	28	26
Gawler River	*	16	14
Georgetown	*	14	12
Geranium	1103	28	26
Gladstone	‡	13	11
Glencoe	*	19	17
Glossop	1096	18	16
Goode	*	18	16
Green Patch	1086	16	14
Gulnare	‡	—	—
Gumeracha	*	16	14
Halidon	*	—	—
Hartley	‡	11	—
Hawker	*	17	15
Hilltown	*	—	—
Hookina	‡	12	10
Inman Valley	*	—	—
Ironbank	*	14	12
Kadina	*	—	—
Kalangadoo (Women's)	‡	14	12
Kalangadoo	1120	14	12
Kangarilla	1004	—	—
Kanmantoo	*	14	12
Keith	*	—	—
Ki Ki	*	—	—
Kilkerran	1084	17	15
Kimba	*	—	—
Kingston-on-Murray	*	—	—
Kongorong	‡	12	10
Koonibba	*	13	11
Koppio	‡	16	14
Kringin	*	—	—
Kybybolite	*	12	10
Lake Wangary	*	14	12
Lameroo	1103	20	18
Laura	‡	14	19
Lenswood and Forest Range	*	—	—
Light's Pass	1082	—	—
Lipson	1086	—	—
Lone Gum and Monash	‡	11	16
Lone Pine	1080	—	—
Longwood	1104	—	—
Loxton	*	—	—
Lucindale	*	—	—
Lyndoch	1079, 1082	12	10
McLachlan	‡	—	—
McLaren Flat	1104	—	—
MacGillivray	‡	17	15
Maitland	*	12	10
Mallala	*	16	21
Maltee	1087, 1094	13	11
Mangalo	*	—	—
Mannanarie	1074-5	12	10
Marama	1098	—	—
Meadows	*	11	16
Meningie	*	—	—
Milang	1107	14	12
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Minnipa	*	11	16
Monarto South	1098	—	—
Moonta	1085	13	11
Moorak	*	12	10
Moorlands	*	—	—
Moorook	‡	16	14
Morchard	1074	14	12
Morphett Vale	*	19	17
Mount Barker	*	11	16
Mount Bryan	*	—	—
Mount Byran East	*	—	—
Mount Compass	*	—	—
Mount Gambier	1118	14	12
Mount Hope	1089	14	12
Mount Pleasant	1109	—	—
Mount Remarkable	*	—	—
Mount Schank	*	17	15
Mundalla	*	11	—
Murray Bridge	1103	17	22
Mypolonga	1103	11	16
Myponga	*	—	—
Myrla	*	14	12
Nantawarra	1082	12	10
Naracoorte	‡	14	12
Narridy	*	21	19
Narrung	*	21	19
Neeta	*	—	—
Nelshaby	‡	14	12
Netherton	1103	14	11
New Residence	1100	—	—
North Booborowie	1075-6	17	15
North Bundaleer	*	—	—
Northfield	*	—	—
Nunkeri and Yurgo	*	1	6
O'Loughlin	*	11	16
Orroroo	A.M.	—	19
Owen	1082	13	11
Parilla	1100	13	—
Parilla Well	‡	16	14
Parrakie	*	—	—
Paruna	*	—	—
Paskeville	1084	13	11
Pata	*	—	—
Penola	*	7	5
Petina	1094	28	26
Pinnaroo	*	15	19
Pompoota	*	11	9
Poochera	‡	7	5
Port Broughton	*	13	11
Port Elliot	1116	18	16
Port Germein	*	21	19
Pygery	1089	14	12
Ramco	1102-3	16	14
Rapid Bay	1109	7	5
Redhill	1076	—	—
Rendelsham	*	11	16
Renmark	*	12	10
Riverton	*	—	—
Riverton (Women's)	*	—	
Roberts and Verran	1090-92	12	10
Rockwood	1110	16	14
Rosedale	1080	18	16
Rosy Pine	*	—	—
Rudall	*	12	10
Saddleworth	*	—	—
Saddleworth (Women's)	*	10	8
Salisbury	1082	3	1
Salt Creek	*	—	—
Sandalwood	*		—
Shoal Bay	1112-3	17	—
Smoky Bay	*	14	—
Spalding	*		—
Stockport	‡	20	18
Streaky Bay	1094	—	—
Strathalbyn	1116	17	15
Talia	1094	14	12
Tantanoola	1120	14	12
Taplan	‡	17	15
Tarcowie	‡	17	15
Tarlee	1081	17	14
Tatiara	‡	21	19
Tweedvale	1113-5	19	17
Two Wells	1081	—	—
Uraidla & Summertown	‡	2	7
Veitch	*	—	—
Virginia	*	—	—
Waikerie	*	—	—
Wall	*	—	—
Wanbi	*	—	—
Warcowie	1074	17	15
Watervale	*	—	—
Weavers	*	16	14
Wepowie	‡	17	15
Whyte-Yarcowie	*	—	—
Wilkawatt	*	14	12
Williamstown (Women's)	1082	4	2
Williamstown	1082	13	11
Willowie	1074	11	16
Wilmington	*	11	16
Windsor	*	—	—
Winkie	*	—	—
Wirrabara	*	—	—
Wirrega	*	—	—
Wirrilla	‡	14	12
Wirrulla	‡	14	12
Wolowa	*	—	—
Wookata	*	—	—
Wudinna	*	—	—
Wynarka	1102	—	—
Yacka	*	17	15
Yadnarie	‡	17	15
Yallunda Flat	*	—	—
Yaninee	*	—	—
Yeelanna	1093	14	12
Yongala Vale	*	—	—
Yorketown	*	—	—
Younghusband	*	19	17

* No report received during the month of May. ‡ Held over until next month.
A.M. Annual Meeting.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

WARCOWIE (Average annual rainfall, 12.16in.).

April 16th.—Present: 11 members.

FARMING IN THE NORTH.—Mr. W. Crossman, who read a paper dealing with this subject, said the farm should be divided into several paddocks and each rested occasionally, because continuous cropping was not a successful practice. It was advisable to adopt a system of rotation, *i.e.*, a crop of barley or oats could be sown where wheat was grown the previous year. For such a purpose peas were an excellent crop, but owing to the lightness of the rainfall in the northern areas peas were not sown to any extent. He thought a number of varieties of wheat should be sown, because where one variety failed to yield a good return, another sort would perhaps produce a profitable crop. A good discussion followed.

EURELIA, April 12th.—The Hon. Secretary (Mr. E. P. Ware) read a paper from the *Journal of Agriculture*, "Care of Farm Stock." In the discussion that followed, reference was made to the number of lambs killed by foxes. It was generally agreed that poisoned baits was the best method of destroying the pests.

MORCHARD, April 12th.—Extracts from the *Journal of Agriculture* were read by Messrs. F. Scriven and N. Lillecrapp. Mr. F. Scriven also gave the results of experiments that he had carried out in connection with the application of different quantities of superphosphates to the soil.

WILLOWIE, April 2nd.—Mr. D. R. McCallum read a short paper, "Care of Horses," and an interesting discussion followed.

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

MANNANARIE.

March 20th.—Present: 24 members and nine visitors.

Mr. H. E. Robinson read a paper "The Combine *v.* Drill and Cultivator." In the discussion that ensued, many of the members expressed opinions in favor of the combine, whilst others thought the implement left much to be desired as a weed destroyer.

QUESTION BOX.—Mr. A. Symons asked "Which is the better method of pickling wheat—in bags by dipping, or loose on the floor and mixing with a shovel?" Members favored dipping the bag. Mr. H. Crawford asked "The best time to cut Scotch thistles?" Some members considered it was a waste of time to cut thistles, particularly on grass land, others thought the best time to cut the weeds on fallow

was when the thistles had run up to flower, especially in wet years. Mr. A. T. Symons asked "Is 1¼in. working sufficiently deep to cut Bathurst burr?" Members thought the depth quite sufficient to kill the weed.

MANNANARIE.

April 17th.—Present: 17 members and six visitors.

CARE OF FARM IMPLEMENTS AND MACHINERY.—In the course of a paper dealing with this subject, Mr. A. Symons said the first point was to see that a good iron shed was provided for all farm implements where wood was used in the construction, failing that, a brush shed could be erected, but it would always be dangerous on account of fire, and would also be a harbor for sparrows. A coat of boiled linseed oil should be applied to wood work, particularly the wheels, and an occasional coat of paint on the metal work (especially the heads of nuts to prevent rust) would be beneficial. Before commencing work in the field all implements should be in good order. The first thing to look to with the drill or combine was the super box, all the parts should be thoroughly cleaned and given a coat of paint. A dirty super box meant an uneven feed. All worn out parts should be replaced with new ones. During the nights of the working period, the drill box should be covered, because the dew made the super "cake," and there was a likelihood of bursting the cogs when starting. The plough and cultivator were two implements that required very little attention, the wheels and feet being the only main points to watch. Harrows should have good, sharp tynes to work satisfactorily. The binder and harvester were the implements which required the most attention of all farm implements. The binder should have grease removed from bearings and rust from the retainer and knotter, because if that were not done, the machine would not tie properly. Besides those few points a thorough overhauling or refitting of parts before starting was advisable. When hay cutting was finished all canvasses should be rolled up and put away from mice. In caring for the harvester it was necessary to see that the comb was not too open or a considerable amount of grain would be left on the straw. The proper adjustment of the winnower was also an essential part to be considered, because it was difficult to make a good, clean sample and not lose wheat. The greatest care should also be exercised in lubrication otherwise the parts would wear out rapidly. When harvesting was finished the elevators should be cleaned and the belts oiled. A prop under the offside of the comb would prevent the machine sagging. The most important part of the harness was the collar. It should never be allowed to lose its shape before being relined. If two or three old collars could be kept on hand they would be very useful for horses with sore shoulders, because they could be cut to ease any part of the shoulder. Reins, winkers, and couplings also needed more attention than they received in some cases. The number of accidents would be considerably reduced if that were given. Reins and couplings required a coat of neatsfoot oil at least twice a year, otherwise they became hard with being exposed to the weather. Wagon and cart saddles should be relined before they were worn out of shape. When leading harness had to be used, as in a tandem team, it was a good plan to cover it each night with an old bag. Riding saddles and bridles should never be oiled, but given a coat of harness dressing.

NORTH BOOBOROWIE (Average annual rainfall, 16.35in.).

March 18th.—Present: 11 members and four visitors.

PROFIT FROM LUCERNE GROWING.—Mr. H. Dawson contributed a short paper on this subject. He thought sheep would bring in a fair amount of profit in that district. If a mob of about 300 ewes were bought after shearing time at £1 per head, and were sold after the next shearing he considered they would realise about £1,000. In the summer time they could be put in the stubble or a dry grass paddock. The lucerne could then be pressed and sold at about £6 per ton. A profit of about £1,000 could also be made in that district by keeping, say, 45 cows. During the discussion which followed, Mr. Bristow asked if there was a ready sale for pressed lucerne. Members were of the opinion that the sale depended a great deal on the seasons in the back country. Mr. Mudge did not consider that 50 cows would return £1,000. Mr. Dawson replied that with the sale of pigs and calves, as well as cream, it would be quite possible.

NORTH BOOBOROWIE (Average annual rainfall, 16.35in.).
April 16th.—Present: seven members and visitors.

HAYMAKING.—The following paper was contributed by Mr. J. Sullivan, jun.:—"The most suitable wheats for hay in this district are "Crossbred 53," "Queen Fan," "Yandilla King," and "Bluey." Federation is too dry in the straw, and the wheat shakes out of the heads very easily when it it being taken from the stack to the cutter. For feeding on the farm, it is advisable to cut hay slightly on the green side. It should be left in the sun one full day before being stooked, and then placed in stooks four or five sheaves wide. It is not advisable to make large stooks, because they take too long to dry and are more easily damaged by rain than the smaller stooks. Before commencing the stack, a good bed of straw should be laid down to protect the bottom sheaves from damp. The walls of the stack should be given an outward slope in order to run the water from the roof clear of the sides. The centre of the stack should be 4ft. or 5ft. higher than the sides before the roof is commenced, and the roof started with the heads of the sheaves projecting outwards. If the stack is properly roofed, it is not necessary to use loose straw on the top. The stack should be thatched or covered with rubberoid roofing if the hay is to be allowed to remain in the paddocks for a year or two."

REDHILL (Average annual rainfall, 16.79in.).
April 15th.—Present: 15 members.

MATING AND CARE OF THE BREEDING EWE.—Mr. S. A. Bates read the following paper:—"During the period of high prices for both the wool and carcass of sheep it is advisable for the flockowner to exercise the greatest of care in tending the breeding ewes. The rams are usually joined with the ewes about the middle of November and removed at the middle of January. The majority of lambs will be dropped in April and early in May, and the whole flock will have finished lambing at the end of May. With a good reserve of feed an early lamb is preferable to one dropped later in the season. The former will cut more wool and the lamb is better able to look after itself when weaned. If correct mating is to be pursued, the ewes and rams must be classed in the wool, and after shearing marked with a distinct number. Many flockowners make a practice of buying good flock and selected rams from a reputable stud, and then count off the ewes and turn in the rams. This leaves mating to chance. The better way is to buy the rams in the wool and class the ewes accordingly and breed with an object in view. In open country and large areas 3 per cent. of rams will be required, but where the paddocks are small 2 per cent. will be found enough. In the case of young rams being used, it is always an advantage to have an extra ram or two on hand, because they are hard workers and very often fall away in condition and have to be removed from the flock. The rams, when removed from the ewes, should be carefully examined, crutched, and the wool cleaned from the pizzles, and heads that have been scarred through fighting should also be attended to. The rams should then be put in a fresh paddock of green feed. The ewes should be carefully crutched before lambing, but it is not a wise plan to handle the ewes during the fourth month of pregnancy, for this very often harms the ewe. The crutching should be done in a woolshed and not in the corner of a paddock as is very often the case. The man engaged in crutching should not under any consideration "leg" the sheep on to the board, but should carefully carry them out and place them in position on the shearing board and shear the crutch out cleanly and up over the tail for at least 3in. It is also advisable to clean around the udder carefully to minimise the danger of fly pests. The ewes, when crutched, should be counted and put in their respective paddocks, which should have enough feed to carry them over the lambing period. Give the ewes all the attention possible, drive or ride through them at sunrise and again before sunset. Pick up and bury or burn any dead lambs and remove any dead ewes, because these draw pests, such as crows, hawks, foxes, and blowflies, to the lambing paddocks. Occasionally the ewe will need assistance during the birth of the lamb. This should be given gently, as little force as possible being applied. In a normal presentation the nose of the lamb protrudes with the two front feet showing under it. If the presentation is tail first the lamb should, if possible, be pushed gently back until it is possible to

secure the hind legs, when the rest will usually follow easily with a gentle downward pull. When the head only appears, it should be moved back and the assistant should try to get hold of the front feet and gently pull the head and feet at the same time. In the case of twins the head of one may only appear, and the one underneath should have been the first to arrive, the assistant should try to get the top lamb and secure the head of the bottom one. The lamb will probably be dead, and if the head is secured it should be cut off and the front feet obtained. After the removal of the lower lamb, the other will come naturally. After the lamb is born the assistant should move to a distance promptly, because the ewe is likely to run off and leave the lamb. This may be overcome by tying the legs of the ewe and placing the lamb at her head, and when released some time after she will probably mother the lamb. Occasionally a ewe will be found down after lambing and will be weak and stiff. Turn the ewe on the other side and work the two front legs; the same attention should also be given to the hind legs. Place the ewe on her legs and try to get her to walk a little by holding her weight. If the sheep will stand alone the helper should remove to a distance and soon it will attempt to move off and will probably fall again, but, in most cases, if picked up a few times, will soon find the use of its legs. If very weak, the ewe is still worth saving and should be removed to the woolshed, where attention for a few minutes each day for a few days will probably put the animal on its legs. Always work quietly amongst the ewes and lambs. Always leave the dog at home or keep it well under control when in the lambing paddock, and by the end of the season the ewes and lambs will become so accustomed to your movements that they will not fear you."

BRINKWORTH, May 5th.—The inaugural meeting of the Brinkworth Branch was held in the local Memorial Hall on Monday, May 5th. Mr. F. C. Richards, of the Department of Agriculture, was present and delivered an address, in which he dealt with the objects and working of the Agricultural Bureau.

SUPER?

THE BEST CERTAINLY IS

"TOP"

The Adelaide Chemical & Fertilizer Co. Ltd.

LOWER-NORTH DISTRICT

(ADELAIDE TO FARRELL'S FLAT.)

BETHEL.

April 8th.—Present: eight members.

FARM HARNESS.—Mr. F. Geue read the following paper:—"One of the most important points with all harness is to oil it well and often. All farm harness should have at least two dressings in one year. I have found a mixture of equal parts of neatsfoot oil and tallow very good for ordinary working harness, and if this is applied occasionally it will lengthen the life of harness very considerably. To think that it costs too much to repair harness is incorrect. The expenditure of a few shillings, especially on the collars, will make them last for a longer period. Attention should be given to the rim as well as to the lining of a collar. Have it repaired as soon as possible after it is worn through on any part, it will not only save the collar, but also in many cases save the shoulders of the horse. Many farmers say they have not the time to oil harness, but I make it a practice to keep the oil in the stable and oil the harness occasionally when the horses are feeding during dinner hour. Horses will not get sore shoulders so readily if backbands are used. These should not be too long in order to make a straight pull from the hames to where the backbands are hooked on to the chains. If there is a swaying of the swings, such as happens when working hard, stony, or stumpy country, the backbands will take away to a great extent the wear from the horses' shoulders and thus prevent sore shoulders. It is advisable to have a breast plate on hand so that if a horse shows signs of sore shoulders the plate can be used for a day or so, and if the collar is used again and exchanged at different times with the breast plate, it is quite probable that the shoulder will heal while the horse is at work."

BLACK SPRINGS.

February 19th.—Present: 12 members.

MIXED FARMING.—Mr. A. Mickel read the following paper:—"The present high cost of production, the low price of wheat, and the wet seasons that have been experienced during the last few years have tended to make wheatgrowing a barely payable proposition. A system of mixed farming is essential. For this I favor wheat and sheep. For wheatgrowing the first thing is a good, clean fallow, and ploughing should be finished by the end of August. To be able to work the fallow properly after ploughing, the land should be harrowed at the right time and cultivated before the weeds have gone to seed, because some plants the sheep will not eat. Should summer rains fall, another harrowing will considerably improve the fallow. On the lighter classes of land seeding should be started any time after the middle of April, if the soil is in a suitable condition, to give the crop a good start before the commencement of the general winter rains. On heavy ground the middle of May is early enough to start sowing. If the crop makes an early start it generally grows too much straw if left untouched, but sheep can be used to feed off the crop, which, as a rule, will yield returns equal, if not better, than those that have not been fed off. Sheep at present pay better than wheat, and they are less trouble. The present high price of wool and lambs makes sheep very valuable. It would pay to grow a crop and handfeed sheep with it when there is not enough feed elsewhere, but even should the seasons become better for wheatgrowing and not so good for sheep, it will pay to produce both wheat and sheep, because sheep save the wheatgrower a lot of work on the land."

Mr. S. Foley also read a paper "The Motor Car on the Farm."

On March 18th Mr. A. H. Robin, B.V. Sc. (Government Veterinary Officer) gave a veterinary demonstration in the afternoon, and in the evening addressed a well attended meeting on the subject "Common Ailments of Stock." Mr. F. C. Richards (of the Department of Agriculture) was also present and spoke on "The Work of the Agricultural Bureau and the Department of Agriculture."

FARRELL'S FLAT.

April 11th.—Present: eight members.

GATES ON THE FARM.—Mr. M. J. Marchant read the following paper:—"The best gate in my opinion is one of medium weight, constructed on the cyclone principle, well swung on a post set in concrete to prevent it giving, and, in time, allowing the gate to sag. The fastening should be strong, but simple enough for a child to work. This, of course, is for the gate or gates at the homestead which are frequently used. I also suggest that this gate should be 16ft. wide, in order to allow of any implement up to the 8ft. header passing through, and also to save the trouble and extra time wasted in dismantling the machine or cutting the fence. A very heavy iron gate is not advisable, because the post on which it is swung is seldom strong enough to carry the weight, especially in wet districts, and, as a rule, it is soon dragging on the ground and has to be carried every time it is opened and shut. Some people contend that horses rubbing on them break the lighter gates, but this can be remedied by twisting barb wire around the bars. For the paddocks, where the gates are not so much used, those of wire, if neatly and strongly constructed, serve the purpose. The fastening should be strong and easily manipulated. I favor the strainer principle. These gates, too, should be wide enough to allow of the largest implement on the farm passing through."

LYNDOCH (Average annual rainfall, 23.01in.).

March 20th.—Present: 12 members.

DAIRYING.—In the course of a paper under the title "Breeding and General Management of Dairy Cows Kept as a Sideline on a Farm," Mr. A. Springbett said his first experience had been with stock that were left to forage for themselves in the paddock. If green feed were available, they gave a fair supply of milk, but failing to find the necessary feed they went dry after having been in milk only for four or five months. Such a state of affairs, he was sorry to say, was still in evidence at the present time. He was convinced that if haystacks, that were ultimately sold to a chaff merchant at, say, about £3 per ton, were fed to the dairy cows the returns from the fodder would be far greater. Many years ago he had laid down a small plot of lucerne; fed to the cows at milking time this was responsible for marked improvement in the yield of the dairy herd. That led him to feed the cows with hay, chaff, &c., during the winter. Although the cows appeared to receive ample feed in the paddock, they did not give down their milk unless a small quantity of chaff was given to them at milking time. Cocky chaff had been tried, but he thought its place was anywhere but inside the stomach of a cow. Unless there was good green feed in the stubbles Mr. Springbett considered that it was better to leave such feed to the young stock, because if the cows were placed in poor stubble paddocks the milk flow would certainly decrease. Some time later the addition of bran to hay chaff was tried, and the increase in the milk yield was immediately noticeable. When feed was scarce in the paddocks, he gave the cows 10lbs. to 12lbs. of chaff and about 5lbs. of bran. Keeping records of performances of the cows was an excellent plan. In addition to being a means of stimulating interest in the work of the herd, it enabled the farmer to gauge the worth of individual cows, and it was also a guide to the health of the animals, because if the test showed a falling off the dairyman would immediately suspect that that cow was not in good health and steps could be taken to treat her without delay. His cows had been tested at the butter factory. When samples were forwarded for testing, care should be taken to see that equal quantities of the morning and night milk were taken as soon after milking as possible, and that the milk was thoroughly stirred before the sample was taken from the bucket. He had tests made twice during the lactation period of each cow—the first about a month after the cow came in, and the second, a month before drying off. The two tests could then be averaged and a fair indication of the yield for the whole of the period would be obtained. Referring to the health of the cows, Mr. Springbett said he had found a dose of 6ozs. of Glauber salts, 2ozs. of ginger, and 1½ pints of fairly hot water to be an excellent drench for cattle. One of the old style lemonade bottles could be used for drenching. To drench the cow the following procedure was suggested:—"Tie the animal up, and pass the left hand down the front of the head, taking a grip of the nostrils with the thumb in one and the first finger in

the other. Then raise the head of the cow until the lower jaw is in a horizontal position, and with the bottle in the right hand gently pour the drench down the animal's throat." As to the different breeds of dairy cows, he said, it was a difficult matter to mention any one breed as being better than another. He did not consider the Jersey a suitable breed for the farm. These animals were undoubtedly good butter producers, but after they had served their period at the bucket they were almost unsaleable for beef, and the calves could not profitably be weaned for vealers. He preferred the heavier breeds—the Shorthorn or the Friesian. Both breeds were heavy milk producers, and the extra quantity of skim milk that was obtained was a very profitable form of food for pigs, which should always be kept in conjunction with a herd of cows. Whatever breed was decided upon the aim should be to improve that breed by using a bull whose ancestors were heavy producers. The heifer calves from cows that had proved themselves profitable animals by the test should be retained. Mr. Springbett then gave a detailed table of the performances of the six cows of his dairy herd. Continuing, he said the milking shed on his holding was a straw roofed structure, the back and both ends being closed in with iron and the open side facing the east. The manger was built with stone, the inside being covered with a coat of cement. The cows were tied up whilst being milked and fed. A leather strap was kept on the cow's head around the horns, and a short chain with a spring hook was fixed to the head of the stall. The spring hook clipped on to a metal ring on the strap around the horns, and the cows could be quickly tied up or released. Water should be provided in such positions that the cows would have easy access to it at any time. He always made a practice of washing the teats and udder of each animal before it was milked. The average takings over a period of four years from his six cows were as follows:—Cream returns, £115; new milk used for four families, 365galls. at 1s. 6d. per gallon, £27; butter for three families (6lbs. per week), 312lbs. at 1s. 3d. per lb., £19; making a total of £161. Expenses—Bran and chaff, £46; green fodders and grazing, £14; total, £60, leaving a net balance of £101, or a total profit from each cow of £16 6s. 8d.

LONE PINE.

January 24th.—Present: 12 members.

HARVEST REPORT.—The 1923-4 season, with its unusual weather conditions, and the effect which they had on seeding operations, and the subsequent development of the crops was dealt with in a paper by Mr. T. Fromm (Hon. Secretary). Dealing with the results secured from wheats grown in a series of plots sown with about 50 different varieties, and laid out by the Branch with the object of ascertaining the sorts most suitable for hay growing in the district, Mr. Fromm said those which gave most promise were Late Gluyas, Crossbred 53, and Leak's Rustproof. In a general way, nearly all late crops yielded satisfactory results.

ROSEDALE.

April 16th.—Present: 12 members.

PREPARATIONS FOR HARVEST.—The following paper was contributed by Mr. H. Nettlebeck:—"The success of the harvest depends on the preparation given the fallow throughout the year. The method of working the fallow depends principally on the nature of the soil. In black soil it is advisable to keep the surface loose to a depth of from 2in. to 2½in. so that there will be a firm, hard layer underneath, which, even if it has not rained for months, can usually be moulded like putty in the hand. With the fallow in such condition there is nothing to be gained by working it in April in the absence of rain. Black soil is liable to crack after a long, dry spell; then it would be advisable to harrow lightly. This year a very wet and cool autumn has been experienced. Weeds, such as stinkwort, dogweed, and paddy melons, rob the soil of moisture, and, if allowed to develop fully, interfere with the implements at seeding time. The scarifier should then be used before the ground becomes too dry and the weeds too rank. The farmer with black soil has an advantage over the man who has to deal with red clay land. On black soil, one can use the harrows freely because this class of ground never sets hard, but I would not use them on red soils until seeding time. Instead of using the harrows after the plough to level the land, work a narrow shared spring-tooth cultivator. It is advisable to have the fallow in a 'cloddy' condition because

it worked down too finely it will set very hard, and if the paddocks are hilly the soil will wash badly after a heavy rain. Deep cultivation just before seeding time should be avoided on soils of both classes in order not to disturb the seed bed. There is no danger of the black soil becoming so water logged that the germination of the seed will be endangered. The variety of seed to use depends on the district and on the time of sowing. This being a hay-growing district, it is advisable to mix several varieties of wheat with oats. For good, weighty hay I prefer a mixture of oats and Le Huguenot and any of the late wheats, sown at the rate of one-third of each. Any paddocks showing signs of 'wheat sickness' can be improved by sowing oats. For late sowing I prefer early varieties of wheat. No crop will give a maximum yield unless liberally fertilised. At least 1cwt. of 36 per cent. super should be applied at seeding time. It will not cause a rank crop, nor will it burn off the crop in a dry year."

TARLEE.

March 25th.—Present: 20 members and five visitors.

LESSONS FROM THE 1923-24 HARVEST.—In the course of a paper dealing with this subject, Mr. D. L. Clarke said that in that district few farmers had been able to complete their intended seeding last year. Most of the crops, except for a week or nine days in the early part of the season, had been bogged in, and some farmers had not been able to get on their land until late in August, and several kept on drilling until the end of that month. On the speaker's farm the drill had been actually idle for 13 weeks. Generally speaking, the yield from the grain crops that were sown early was disappointing, but the returns for hay were good. It sometimes happened that the early sown wheat did not yield nearly so well as that sown after the second rain: such was the case last year. Any land that was bogged in, except the black soil, did not give good returns. The surprise of the season was the good returns from the crops sown towards the end of August. That, of course, was due to the late spring and early summer rains. The great difficulty was in getting a good seed bed owing to the leather-like surface of the ground. A good seed bed was very desirable at any time, but for late sowing it was absolutely necessary, otherwise the germination of the seed was delayed. The lessons to be learned from the past season, in the opinion of the speaker, were as follows:—"Do not pug in the seed during wet weather unless it is land that will not run together. Be very careful in the preparation of the seed bed, and it will also be noticed that Nature generally arranges conditions favorable for a harvest." In the discussion that followed, Mr. J. Kelly remarked that in September last he worked an area of fallow which he had previously been unable to sow with wheat owing to the wet seeding. The paddock was sown with Sudan grass for a summer crop. The crop made splendid growth and when harvested in February gave a highly satisfactory return for seed. Mr. A. L. Molineux said he had sown oats last year at the rate of 1½bush. per acre and 90lbs. of 45 per cent. super, which gave a return of 2½ tons of hay per acre. Mr. Molineux further stated that the most important lesson he had learnt from the 1923-24 season was to be ready to push on with seeding as soon as conditions were favorable. Mr. G. M. Cornish said he had sown a paddock with peas, and, although late and conditions unfavorable, a return of from five bags to six bags had been obtained. A very satisfactory return from Sudan grass both for seed and pasture had also been obtained.

TWO WELLS (Average annual rainfall, 16.36in.).

January 28th.—Present: eight members.

HARVEST REPORT.—A lengthy and detailed report dealing with the 1923-4 season was read by Mr. H. J. Pratt. After referring to the weather conditions and the effect they had on seeding operations, and the subsequent growth of the crops, Mr. Pratt enumerated the cultural and manurial practices which had been adopted with each individual variety of wheat and oats that he grew and the yields secured from them. During the discussion which followed, Mr. L. L. Wasley said Daphne had been his best crop, cutting 3 tons of hay and reaping 21bush. per acre. Mr. H. W. Kenner stated that King's White from the Roseworthy Agricultural College

had yielded 25bush.; Sultan, 22bush.; Ford, 16bush.; and Daphne, 16bush. Baroota was the best all-round crop, cutting 1½ tons of first quality hay, and reaping 18bush. of first class seed.

LIGHT'S PASS, April 16th.—Mr. A. Baker (Dairy Instructor at the Roseworthy Agricultural College) attended the meeting and delivered an address, "Dairying," to an audience of 19 members and four visitors.

LYNDOCH, April 17th.—The meeting took the form of a "Question Box," when a number of subjects of timely interest were brought before members for discussion.

NANTAWARRA, April 17th.—Mr. Pridham read a short paper, "Farm Management," and an interesting discussion ensued.

OWEN, April 25th.—Mr. D. F. Laurie (Government Poultry Expert) attended the meeting and delivered an address "The Poultry Industry."

SALISBURY, April 18th.—Sixteen members and several visitors attended the meeting, when Mr. G. Hambly read an informative paper on "Lucerne Cultivation."

SALISBURY, May 6th.—A well attended meeting of members and visitors was addressed by the Assistant Dairy Expert (Mr. H. J. Apps), who dealt with the subjects "Herd Testing" and "The Importance of Breeding."

WILLIAMSTOWN, April 25th.—Mr. W. Gilbert read an interesting paper, "Sheep Breeding," and a lengthy discussion followed. Mr. D. Manser presented a report of the Conference of Lower North Branches of the Agricultural Bureau, held at Riverton on April 10th.

WILLIAMSTOWN (WOMEN'S), April 2nd.—Mrs. Wild read extracts from an article "Infectious Diseases," which provoked an interesting and instructive discussion.

YORKE PENINSULA DISTRICT.

(TO BUTE)

BRENTWOOD.

March 27th.—Present: 17 members and two visitors.

FARM EQUIPMENT.—The following paper under the title "Most Up-to-date Equipment for a 640-acre Farm" was read by Mr. H. Le Poidevin:—"First of all I would suggest a spur-wheeled tractor to take the place of the horses, and next an adequate supply of water. Next a 12-furrow plough, which would be large enough for the tractor, and fallowing with this implement would cost about 1s. 3d. per acre. For ploughing back the same plough could be used, thereby saving the expense of an extra plough. Twelve diamond harrows can be worked by the tractor on top gear. For sowing the crop I favor a 17-hoe combine. In harvesting, the farmer has to consider local weather conditions, and on a farm of 640 acres one man should be able to handle the harvest without additional labor, so that I suggest the farmer should purchase a machine that can handle all classes of crops, i.e., a 12ft. reaper thresher. The farmer with a tractor will find it best to pay to have the grain carted to the port, but a 3in. spring trolly with two horses would be useful for farm cartage, such as hay, seed, and super." In the discussion that followed, Mr. F. J. Nation said it had yet to be proved that the tractor was better than horses for a one-man farm. A team of eight good horses he considered sufficient to work a 640-acre farm, and if a farmer bred only a foal or two every year, in eight years he would still have a good team. Sheep might have been included as part of the plant necessary on a farm. Mr. C. H. Boundy said he was convinced that the tractor was an ideal machine for a farm comparatively free from stones and stumps, but he did not advocate one for rough land. Last season, on good land, the cost of the work done by his tractor was—Ploughing back with 10-furrow plough, 1s. per acre; cultivating with 12ft. cultivator, 6d. per acre; rearing down and tangled wheat, 1s. 4d. per acre; 100 acres of barley, five and a half bags to the acre, in 36 hours, at a cost of 9d. per

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acre. That, however, did not include depreciation of plant. Mr. L. G. Boundy agreed with the paper in respect to the suggested implements. He also compared the reaper threshers with the headers and strongly favored the former. Mr. A. E. Twartz was satisfied that the tractor was a particularly good proposition, especially for a one-man farm, but he thought the caterpillar type better than the wheel tractor, especially for seeding. He also favored the combined drill and cultivator. Mr. J. J. Honner considered that for a 640-acre farm of good land a tractor was a valuable asset. He agreed with the paper generally, but there was one very necessary thing omitted for an up-to-date farm, and that was an automobile. Mr. F. L. Carmichael said he had yet to be convinced that the tractor would supersede horses on any farm. If anything went wrong with a tractor the work was held up, but it would be very unusual for a farmer to have all his horses so ill as to stop the work, perhaps at a critical time. Mr. J. Boundy said that time alone would prove whether the tractor would supplant the horse, but up to the present his tractor had given every satisfaction. Last season he had reaped 3,500 bags with it and a reaper-thresher. There was very little cracked grain and no difficulties that could not be overcome with commonsense adjustments. He agreed that the tractor was only suitable for good land, but the combined drill and cultivator was a clear saving of one man's labor, the resulting crops being satisfactory in every respect.

KILKERRAN.

April 15th.—Present: 10 members and two visitors.

THE COMBINED DRILL AND CULTIVATOR.—Mr. J. R. McPherson, who read a paper dealing with this subject, said there could be no doubt that the combined drill and cultivator was a saving of expense and labor to the farmer, for in the first place the "combine" could be purchased for less money than a cultivator and drill. Where the separate implements were employed the farmer only had the use of his money, in the case of the drill, for a short period each year during seeding, but a "combine" could be used to advantage during nearly any stage of cultivation. If a farmer used a drill and cultivator during seeding he would require from six to seven additional horses and an extra man, because a 21-hoed "combine" would work with 10 horses, and a 12ft. cultivator would require 1(horses, and a 21-hoe drill six horses. In wet districts the "combine" was a boon to farmers, because it would work in the wet when a drill would block up. The "combine" would work in any reasonably cleared land with few or no big stumps, small stumps made no difference. The "combine" had the same advantages over the drill as the harvester had over the stripper. The fact that more farmers every year were getting "combines" proved that it had advantages over the drill and cultivator, otherwise the new implement would not be purchased. In the discussion that followed, it was generally agreed that the "combine" could not be worked successfully in very rough country, but Mr. C. F. G. Heinrich was of the opinion that with reasonable care it would work satisfactorily in fairly rough ground, especially the newer machines, because they were built with more clearance than the earlier models, and the floats were very much longer. According to Mr. S. T. Keightley's experience, the shares on the "combine" were set too flat to work in very rough ground. The majority of members favored the "combine" in preference to the drill and cultivator.

PASKEVILLE (Average annual rainfall, 16.10in.).

April 15th.—Present: 12 members.

HAND FEEDING SHEEP.—Mr. R. D. Norris read the following paper:—"The majority of sheepowners have not paid sufficient attention to hand feeding sheep during the early winter months. Some farmers are inclined to think that all that is necessary is to get the sheep, put them in a paddock, and the profit begins without further trouble. But with the high prices now ruling for sheep, it is necessary to take every care, and obtain the very best results in the shortest possible time. I am referring more particularly to keeping sheep in good condition for market, but it is never a mistake to hand feed any class of sheep. Ewes with lambs will hold their condition better, and the lamb will make a stronger growth if the mother is given a ration of a few pounds of chaff, sprinkled with oats or barley each week. The time to make provision for hand feeding is now

approaching, the dry feed is getting spent, and the sheep begin to race after the 'ittle green that is showing, which results in the sheep losing condition in a few days. This can be prevented if the sheep are hand fed on chaff, with a feeder made for that purpose, providing a little trouble is taken to bring the sheep to the feeder a few times and let them smell what it contains. After that they will come around when they see the feeder being refilled. It is necessary to place the feeder within a short distance, say, 20yds. or 30yds. of the water trough. The class of feeder I have been using can easily be made on the farm. It will hold from 15 to 20 bags of chaff, has an iron roof, and the chaff is always kept dry, and whilst the sheep are feeding from the two troughs—one on either side—the troughs are refilled with chaff from a V-shaped bin above. For building this class of feeder, take four pieces of jarrah 4in. x 4in., each 3ft. long, to form the bottom. Then take eight pieces of oregon 3in. x 3in., 3ft. 3in. long, and mortice each of them into the jarrah to form the V-shaped bin above by bolting the oregon in the mortice in the jarrah. The mortices in the jarrah must be about 14in. apart and on an angle, so that the oregon uprights, or side pieces, are 3ft. 3in. apart on the top, thus forming the V-shaped frame work. The length of the trough can be, say, 16ft. or 20ft., to meet the length of timber for the sides and bottom. After the oregon uprights have been bolted into the mortices in the jarrah, put them all in line and position, say about 5ft. apart, to meet the length of the sides and bottom boards. Then nail on flooring boards, the full width of the jarrah. Bolt on the side top pieces of 3in x 2in. oregon. After these two pieces are bolted on the top of the uprights, it is then necessary to put in the two top end stays, which must be 3ft. 3in. long. Next is the divider, similar to a ridge cap, made of any old galvanized iron, placed through the centre from end to end. This should be about 15in. high, to divide the chaff so that equal quantities flow to each side of the trough. The side boards of the bin can then be nailed on to the inner sides of the uprights to within 6in. of the bin floor, thus leaving a space of 6in. for the chaff to flow into the troughs as it is being eaten. The divider keeps it from flowing too quicklly. By these measurements you will have a trough 10in. wide on each side. The side board of the trough can then be nailed on to the side of the bottom of the floor, and also to the ends and stay pieces that are attached from the ends of the jarrah to the top of the oregon uprights. The end of the feeder can be closed with black tin, and a galvanized roof of 5ft. sheet iron, with lids attached for filling purposes. Two wheels on an axle bolted to the bottom can be attached for moving from paddock to paddock. The axle should be attached nearly two-thirds from the drawing end, so that the horse or whatever is used for removing is pulling up a little, and the trough will carry along on the two low wheels, and when in position it is not necessary to lower the wheels into the ground, but simply to place a block of wood under each end, so that both ends are near the same level. Fill the feeder with chaff and bring the sheep around it, keep them there for a while, and if they are somewhat shy, try them again the next day and so on, and when once they do know what it contains, there will be no further trouble. In my opinion, it is just as necessary to hand feed sheep as any other stock during the early winter months."

MOONTA, March 22nd.—A paper dealing with the subject "Sheep on the Farm" was contributed by Mr. C. Cook. A keen discussion followed, in which Messrs. J. and E. C. Atkinson, D. Kitto, M. McCauley, J. Brinkworth, and W. Edge took part.

WESTERN DISTRICT.

DARKE'S PEAK.

April 2nd.—Present: seven members and two visitors.

HORSES ON THE FARM.—In the course of a paper dealing with this subject, Mr. P. A. Miller said there were many points to remember when caring for horses on the farm. First, horses were one of the main servants of the farmer, and the animals could not do justice unless they received proper care and attention. The following points should be carefully considered by every teamster:—"First, good feed given at regular intervals; second, provision made for an ample supply of

water; third, regular work, and hours of work not too long; fourth, good and clean stables; fifth, well-fitting collars in good repair.'' If those points were remembered the team would always be in good heart for a day's work. The teamster should not expect three horses to do the work of four. He was a firm believer in feeding long hay when the horses had plenty of time to chew. In dinner hours, he advised giving one kerosene tinful of chaff with crushed oats and bran. It was also advisable to provide a salt lick, and to sprinkle salt on the hay when it was being stacked. The trough should be some distance away from the stable, and the horses should be watered before feeding. It was a mistake to work the horses late in the evening, because nothing made a horse more leg weary than working after sundown. A good cure for sore shoulders was to wash the shoulders with cold water at dinner times and at night. A good discussion followed.

GREEN PATCH (Average annual rainfall, 26.56in.).

March 17th.—Present: 10 members.

FODDER CROPS.—The monthly meeting was held at Mr. R. Sinclair's homestead. Mr. Sage drew the attention of members to his fodder crops which were inspected by the Branch during February. He had turned dairy cows on to them, and it was noticeable that the cows wandered over the plot and finally settled down on the Japanese millet and never left it until it was eaten out. The sunflowers were the last to be eaten by the herd. He was of the opinion that Japanese millet was the best summer fodder for cows. He advised sowing the seed about the middle of October on well worked fallow. On no account should the plot be harrowed after it was sown. Mr. Sage also read an extract from a letter received from the Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch, B.Sc. (Agri.), M.R.C.V.S.), advising sowing rye and oats in equal parts each way across a plot to provide fodder for mares and foals. Several members present said they had tried that practice and were pleased with the results.

LIPSON.

March 22nd.—Present: 10 members.

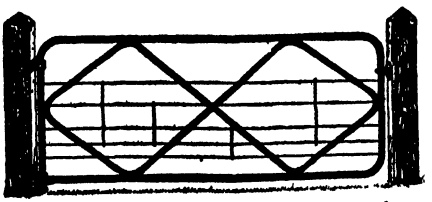
CARE OF FARM HORSES AND HARNESS.—The following paper was read by Mr. R. C. Carr:—''Every care and attention should be given to the team on the farm, because the farmer depends to a very large extent on its services for his livelihood. A team that is well cared for can always be relied upon for a good day's work. In the first place a good, warm stable is essential and should be built on rising ground facing the east. I do not favor confining the horses in a small yard all night. If a small enclosure of about 5 acres adjoining the stables is fenced in and well sheltered by a good growth of timber, it will be very much better for the animals because it will give them more liberty and a better chance of having a good roll and a good rest on dry ground. If, however, the horses have to be kept in a small yard, it should be cleaned out once every week and straw bedding provided. The next item of importance is feeding, and regular feeding hours should not be overlooked. Good hay chaff should be given three times a day, and bran can be added to the midday feed because it is a good medicine for horses. For the last feed at night I recommend long wheaten hay. It is a mistake to give the horses more feed than they can clean up at night. The team should have from one and half hours to two hours feed in the morning before going to work, and always watered before feeding if possible. A horse should not be made to work a full day immediately after it has been brought in from a long spell. Placing a few lumps of rock salt in the manger is a good thing for the horses if they are drinking fresh water. Every horse should be provided with a good fitting collar—I prefer the pipe collar to any other kind. A back band should always be used, especially in low draughts, because it keeps up the chains and holds the collar in a better position. If horses are kept in good condition and properly groomed, they should never be troubled with sore shoulders. In nearly every case low condition, badly groomed shoulders, and ill-fitting collars are the cause of sore shoulders. Another important point is the care of harness, because of the very marked increase that has taken place in the cost of all leather during the last few every farmer should exercise the utmost care in its

upkeep. If reasonable care is taken, the harness will last for many years and be a pleasure to use and a credit to the owner. All new harness should be well oiled before being used, and all other harness should be oiled at least twice a year with neatsfoot oil and kept in a good shed adjoining the stable. It is a mistake to hang the harness in the stable, because the horses are very apt to knock it down and trample it under their feet. Harness should never be left out in the weather when not in use. Finally, when the collars are placed on the horses, they should be carefully examined to see that no dirt or grit is on the lining, because this is often the cause of horses contracting sore shoulders."

MALTEE.

March 14th.—Present: 16 members and three visitors.

FALLOWING.—The following paper was read by Mr. A. J. Bowell:—"The subject of fallowing is a very complex one because so much depends on the nature of the soil and seasonal conditions that it is impossible to lay down any hard and fast rules for the work. The stiffer clay and loam soils can, with advantage, be fallowed to a greater depth than the lighter sandy soils, say, 2in. to 3in. in the heavier soils, such as are to be found at Maltee, and 1½in. to 2in. in the lighter soils. Fallowing should be commenced as soon after seeding as possible and finished before the grass seeds are matured. Soil which forms into clods should be worked with the cultivator and harrows. Second and subsequent workings should not be done so deeply as the first, the main object being to kill weeds and form a fine surface tilth with a fairly fine seed bed. In sandy or powdery soils so much work is not profitable, and, in fact, will probably prove harmful, being liable to bring on take-all. Land which is inclined to run together in hard lumps can be rolled and then harrowed, but all, or as much as possible of this working, should be done whilst the ground is wet." In the discussion that followed, Mr. Marchant said he did not favor fallowing too early, because the bulk of the grass seeds would not have germinated, which would entail more work subsequently. Mr. C. T. Schwarz asked what implement the writer favored. Mr Bowell said a properly adjusted plough. Mr. Cranwell said he had tried the tyne cultivator for fallowing, but in wet weather the implement was not a success.

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"TAKE-ALL."—This subject was again brought forward and members said that the disease made its appearance in all kinds of land, but appeared worst on the higher lands on well worked fallow land and on land that had carried a second crop. One member stated that he had observed the fungus this year on land that had only been cropped once after being cleared six years ago.

MILTALIE, (Average annual rainfall, 14.55in).

March 15th.—Present: eight members and three visitors.

HINTS FOR THE NEW SETTLER.—A paper was read by Mr. A. S. Brown:—"In the first place, the blocker should select a homestead site convenient to the road, paddocks, and water runs, he said. A temporary building should be erected as near as possible to the site of the permanent building to avoid difficulties in moving furniture, &c., when a good, substantial house has been built. Dams should be made in several parts of the holding, and, as a standby in case of droughts, an underground tank of at least 30,000galls. capacity should be excavated. For household purposes, two ordinary galvanized tanks of 600galls. capacity should be provided, and tanks should also be provided to conserve the water from the roofs of all outbuildings. Fencing the property was another item which should not be neglected. Sheep were an asset on every farm, and the whole block should be wire-netted with a fence consisting of strong ti-tree posts, with two barbed wires on top and a plain wire half way up the netting. The height of the fence should be about 3ft. 8in. To assist in beautifying the property a garden should be laid out close to the homestead, proper attention being paid to drainage facilities. The garden should not be too large, or it would become neglected. The outbuildings necessary on a farm, if built properly and of lasting material, did much towards enhancing the value of a holding. The stables, which should not be too far from the house, say, about 90yds., should be built of stone with an iron roof, with the open side facing the east. The manger should run the whole length of the stable, and at the rear a space should be left for storing chaff The chaff-cutter should be so placed that the chaff fell in the space behind the manger to save time when feeding. Implement sheds, blacksmith shop, &c., if possible, should be built with stone walls and iron roofs. Bush sheds would last only for a limited period, and at the same time they served as a harbor for birds and vermin. The implement shed, which should have sliding doors, and the blacksmith's shop should be conjoined, and the latter should be large enough to admit any implement, if necessary. The cowyard should be handy to the house, and the yard adjoining enclosed with a good post and rail fence. The fowlhouse should be constructed of iron with as little wood as possible. For perches he recommended old iron bars or piping of suitable lengths. The birds should be housed at night. Horses, cattle, &c., were a valuable asset of the farmer, and his advice to the prospective farmer was 'Commence with good stock and keep on breeding good stock, the extra outlay will be amply repaid.' A well-bred animal was no more expensive to maintain than a mongrel. "Above all things," he concluded, "have a place for everything and keep everything in its place. How many farmers leave valuable machines without cover in all weathers? Remember a machine properly cared for is worth two exposed to the elements." In the discussion that followed, Mr. T. J. McEachern thought underground tanks preferable to dams for a permanent water supply. Mr. D. P. Bagnell considered that a shearing shed should be an important item where sheep were kept, the same could also serve as a barn. For the subdivisional fences he recommended plain wire fences, and preferred underground tanks for conserving water for household use. Mr. W. G. Smith differed from the previous speaker in reference to underground tanks for domestic use, overground iron tanks, he considered, were more sanitary. The Chairman (Mr. J. S. Jacobs) agreed with the writer in reference to permanent material for farm buildings, but did not favor overground tanks for domestic use.

MILTALIE (Average annual rainfall, 14.55in.).

April 19th.—Present: eight members.

DESTRUCTION OF FOXES AND RABBITS.—A paper dealing with this subject was read from the *Journal of Agriculture*. Mr. W. G. Smith, in opening the discussion, said that the present price of sheep should encourage sheepowners to work together by laying baits on their holdings for the destruction of foxes. He advocated dis-

tributing baits along creeks, near rabbit burrows, and around logs. The baits should be placed close to the north side of some obstacle, such as a log, bush, heap of stones, &c., because the fox preferred to keep its nose to the wind, which in that district was mostly in the south. The baits should be buried and a trail dragged over them. If the baits were buried it prevented birds and ants from getting them, and the fox liked to dig its food out of the ground. Mr. J. P. Jacobs said he had poisoned a number of foxes, and his experience showed that it was best to place the trap or bait where the fox was most likely to look for food. He did not favor open country for poisoning, but selected the low scrub or creeks. To trap he suggested the use of a decoy, such as a dead sheep, and advised setting the traps around the decoy. About four grains of strychnine should be used to each bait. Mr. D. P. Bagnell said he had used three rabbits for a trail, the trail being dragged over the baits after they had been covered. Caul fat made excellent baits. Large numbers of baits should be distributed. He favored more strychnine than advised by the previous speaker. Mr. W. J. Deer said he had used fowls for baits, but met with no success until he dragged a trail and laid baits on it. Mr. F. Jacobs said he had poisoned as many as 32 foxes in one day. His method was to drag a dead sheep behind a dray and distribute baits about the size of a matchbox freely on the trail in favorable spots. Mr. J. P. Story said he made a practice of cutting a sheep's liver into about 22 baits and then dragging the paunch of a sheep for a trail, following the creek and low mallee scrub. He advocated laying baits freely before the commencement of the lambing season.

MOUNT HOPE.

April 19th.—Present: seven members.

PREPARATION OF THE SEED BED.—The following short paper was read by Mr. A. Vigar:—"In preparing a good seed bed, the first work is to plough the ground whilst it is dry. This is particularly necessary in this district, on account of the short sowing season. The best depth to plough is from 3in. to 4in., because the subsoil is of an extremely poor quality. When the first rains come and the weed seeds germinate, sowing can commence. The weeds should be destroyed by a set of tyne or disc harrows. The discs should be well oiled and properly set, or they will be of little use. After the seed has been sown, it is sometimes necessary to work the harrows to cover the seed, especially if the drill is old and the discs out of alignment."

PYGERY.

March 21st.—Present: eight members and one visitor.

THE FARM KITCHEN.—Mr. Geo. Day contributed a paper on this subject. In order to ensure health and strength, the farmer should be fed with suitable food properly prepared. That could not be economically accomplished without a well arranged and fitted up kitchen. Many farmers did not give enough forethought and care to the layout of the home. As a large part of the time of the women-folk was of necessity spent in the kitchen, no pains or expense should be spared in making it as comfortable and as pleasant as possible. The kitchen should be given the pride of the place in the home, because the work done there had as great a bearing on the success of the farm as work performed outside. He thought that room should be placed in the south-west corner of the house where ample window light could be provided for. As the prevailing heavy winds came from the north and west in that particular district, he would place the chimney and stove on the east side of the room. If it were placed on the windward side, and were not carried well clear of the roof, the wind would bank up heavily against the roof causing a heavier pressure at the top of the chimney than in the room, thus preventing the free escape of smoke. Bottom ventilation should be provided from outside to the underside of the grate. The front of the fireplace should not be too high or open. Water should be laid on into the kitchen, but the tap should not be too near the stove or fire, because in the event of fire free access to the tap would be required. The room should also be fitted with a good lighting system; he suggested electric lighting as being the least dangerous and most labor saving. The power could be procured from a windmill fitted to supply a storage battery, or possibly an engine might be on hand to run those lights. The color of the walls

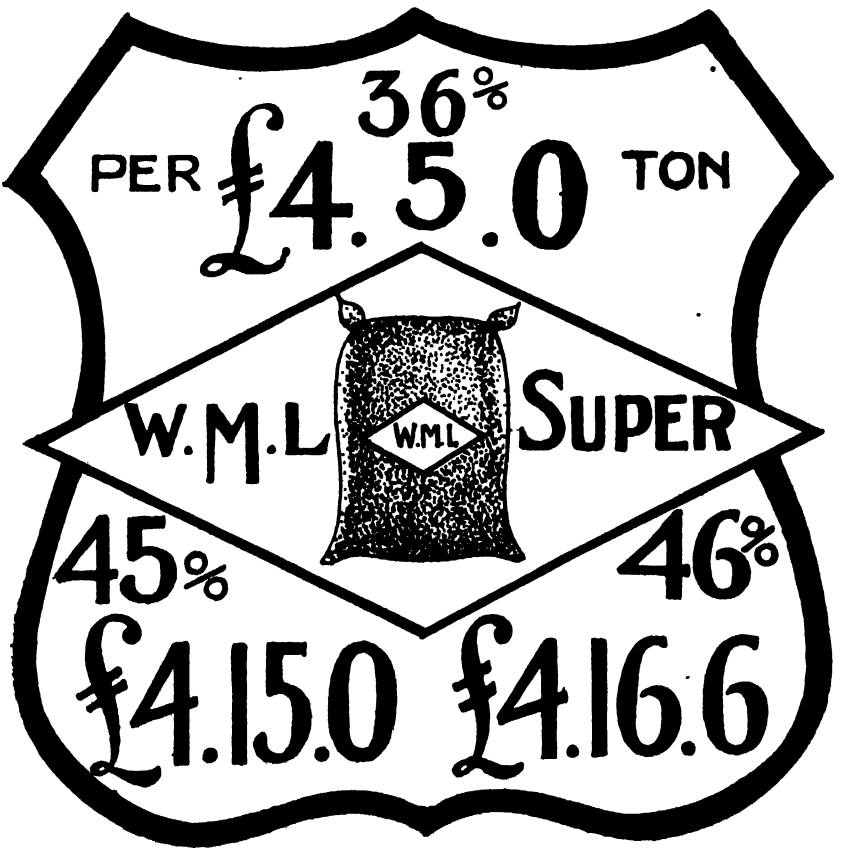
should not be neglected, and the cooks should be given an opportunity to select whichever color they preferred, bearing in mind that the lighter the shade on the walls the greater would be the light. Another convenience would be a large cupboard, or covered counter, let into the wall dividing the kitchen and the dining room and provided with shelves to accommodate the crockery, cutlery, &c. Dustproof doors could be provided opening into either room. All prepared food should pass through there, thus saving much running in and out and the opening of doors. He was convinced that if all possible conveniences were provided, the housewife's time and labor would be reduced by half in preparing and cooking the necessities of life, energy, and strength. In conclusion, he laid stress on the point that the cook should have the most perfectly equipped workshop on the farm instead of being relegated to the most despised, dark, and neglected room in the house. A good discussion followed the reading of the paper, the majority of members agreeing with the views of the writer.

ROBERTS AND VERRAN.

March 20th.—Present: eight members.

MODERN METHODS AND MACHINERY.—The following paper was read by Mr. A. T. Cowley:—"The modern farmer studies the principles of soil cultivation, crop production, and stock raising from a scientific viewpoint, methods of farm management from a business point of view. The high cost of labor, machinery, fertilisers, and other necessities results in a return very little above cost of production, and these compel the man on the land to consider what are the best lines to produce and the best methods of producing them. Under the first heading, the tendency in recent years has been toward the abandonment of the production of any one single line in favor of growing several kinds of crops in rotation and raising livestock. It has been found by following a system of mixed farming that, while cultivating the ground for and producing one kind of crop, much of the preparation required for a second crop of some other kind is effected, so that with very little extra cultivation and manuring the succeeding crop can be produced. The production of a second, and even a third, rotation crop followed by fallow or by pasture and then fallow is found to improve the condition of the land for the production of the first or main crop, which in our district will continue to be wheat. The 'in-between' crops that we can grow do not always find a ready market, but they can be put to profitable use on the farm. The first call on the oat crop is the necessity for providing hay or grain to feed the farm team, thus allowing practically the whole of the wheat crop to be harvested for market. Oats and barley can be fed to cows, sheep, pigs, and fowls, thus increasing the carrying capacity of the farm for these sidelines. More livestock being kept in this way again contribute to the production of the soil by returning a certain amount of natural manure to the land, and such a practice also practically eliminates the necessity for cultivation for the purpose of weed killing on fallows. Along these lines, then, the farmer is making way toward the maximum production from a minimum of cultivation. Ploughing is still recognised as the foundation of all cultural work, but lighter ploughs in many instances, a shallower depth of ploughing, and a recognition of the fact that with lighter cultivation most soils require ploughing with less frequency than has been the custom in the past are factors that have combined to make the slowest of all field operations much more profitable than of yore. Whilst less time and energy are expended upon it, greater production results from each ploughing. In tillage and harvesting, wider implements of lighter draught, requiring only slightly larger teams and fewer of them, have to a great extent solved the farm laborer problem, at the same time do the work more economically. Gradually a system of standardization of power-size of implements and machines is bringing the whole team into work practically the whole time, and the combination of some of the lighter units on the two-in-one principle, such as the cultivator-drill and the complete harvester, results in a further saving of man power, and, in most instances, of horse power also. The most modern problem, which is as yet too new to allow of any man's opinion being accepted as final, is, of course, that of 'all mechanical power' *v.* 'horse power.' The farm tractor has been accepted to work in conjuction with horses, and, I believe, is going to increase production to a profitable extent. As a general rule, at present, the team is being retained. Will the tractor relieve it altogether

and enable the land occupied in supporting the horses in stable or field to be put to other and more profitable use? I think that at this stage we can feel certain that the tractor has come to stay, and although the horse will undoubtedly remain for draywork and other small jobs, and in many instances small to moderate-sized teams also will be kept, the large numbers of horses that have of late years been found on up-to-date farms will gradually disappear.'' Discussing the paper, Mr. D. Jonas agreed with the writer as regards rotation of crops and sidelines. He thought the tractor was a payable proposition, especially in districts similar to Roberts and Verran, where feed and water were scarce at times, but considered a team could not be dispensed with altogether. He favored the combined cultivator and drill because it practically meant that one man could do two days' work in one. He preferred the harvester to the stripper, because the wheat was ready for market earlier when the former machine was used. He did not think cocky chaff was worth the extra cost involved in cleaning the wheat. Mr. C. Masters agreed that the combine was an excellent machine on clear land, but in stumpy land it received too much rough usage. The harvester was suitable for heavy crops on good land, but where the land was rough and the yields uncertain he preferred the stripper. Mr. H. Simmons considered the combine the most economical implement to use at seeding time. The harvester was the machine to use in good crops, but where the yield was light he preferred the stripper and winnower. He agreed that livestock should be carried on the farm because wheatgrowing alone did not pay. Mr. H Smith favored shallow ploughing and running sheep on the fallow to



check the growth of weeds. The combine was an excellent implement for seeding, because it enabled a large area to be put in in a short time, which enabled the wheat to make a good start. The tractor he considered a good proposition for haulage and belt work. The harvester was a good machine because it saved much time when reaping, but he did not favor dispensing with the stripper altogether. Mr. H. Lewis considered the tractor a great time-saver. It would work a combine with harrows attached, and was also able to do other haulage and belt work. He preferred the harvester for reaping owing to the time saved. He favored light ploughing. Mr. B. Evans agreed that stock should be carried in conjunction with wheatgrowing, and of all livestock he considered sheep the most profitable, especially as there was likely to be a shortage of wool for many years. Pigs would also be a good source of revenue when the bacon factory commenced operations at Port Lincoln. Crops should be grown in rotation. He preferred oats to barley for mallee country because the former tended to check take-all and also made much better hay than barley. He held the opinion that the tractor had come to stay, but did not think that horse teams would be wholly eliminated. He favored the combine for seeding where the land was in good condition. The harvester was the ideal machine to use for reaping, but he would not advise doing away with the stripper entirely. He considered 2in. sufficiently deep to plough until the land was fairly clear, when the depth could be gradually increased. Mr. F. Masters agreed that the man who pinned his faith to wheat alone would not do too well. He favored fallowing to a depth of 3in. or 4in. Subsequent cultivation should be as light as possible. He maintained that the land in their district was not too rough to use the combined drill and cultivator. Where the land was bushy it would pay to clear it up for the combine. He preferred the stripper and the winnower, except in very heavy crops. In reply, Mr. Cowley mentioned that deep ploughing would probably have a good effect when the land was consolidated. In connection with harvesting machinery, he thought the time saved by a harvester would more than make up for the loss of the chaff. If the holding was well stocked it would pay to feed off a crop which only promised a low yield of grain. The combine was preferable to an ordinary drill. Where the fallow was kept clean by sheep all the working necessary could be done with the harrows or a light cultivation until seeding time, when the combine was the ideal implement to use.

ROBERTS AND VERRAN.

April 17th.—Present: 10 members.

SEEDING PREPARATIONS.—Mr. C. Masters read the following paper:—"All implements should be overhauled and placed in good working order prior to the commencement of seeding, so that there would be no loss of time during the progress of that operation. Stumps should be picked up and the land made ready for the cultivator or plough immediately after the first rains. Only the best seed wheat procurable should be sown, and every farmer should grade the wheat in order to be certain of sowing only the best grain. Wheat that is liable to be affected with smut should be pickled. All manures should be on hand and stored in a dry place so that there will be no loss of time with the drill. The farm team should be well fed and cared for. The farmer should not bring the team in from the paddock and expect them to work satisfactorily. Harness should be in good repair and the collars stuffed to prevent sore shoulders." In the discussion that followed, Mr. G. Smith said that when horses were brought in straight from a stubble paddock and put to work they could not be expected to do their best work. Implements should be overhauled before seeding commenced. Mr. H. Simmons agreed that all loose stumps and stones should be picked up before one started seeding. Horses should be well fed on hay or hay chaff. Mr. A. Smith said it was a mistake to start seeding with implements that were not in good working order, because it inevitably meant a loss of time later on. Mr. H. Lewis favored putting in a few days repairing implements and getting everything ready for seeding. Horses should be fed on good, hard feed. A bag placed under the collar would do much towards preventing sore shoulders. Mr. F. Masters agreed with points outlined by the writer so far as immediate preparation was concerned, but he held that preparation should commence nine months or ten months beforehand by fallowing and getting in a good

supply of hay, &c. Fallow not only ensured a better return, but also enabled the crop to be put in more quickly. The land should be in such a condition that the crop could be put in as quickly as possible after the rains came. Stock should be carried to keep down weeds and pack the soil, as well as for the direct profit to be derived from that source. Mr. B. Evans agreed that fallow was essential if good returns were to be secured. He considered it a mistake to sow oats dry on old land on account of the weeds, and favored ploughing the land as soon as the stubble was burnt and cultivating ahead of the drill after the first rains. Mr. M. Masters thought that after the first six years all crops should be sown on fallow, half wheat and half oats. The results would be better than if a larger area of wheat were put in and the oats sown roughly. Seed should be graded and pickled in a 2 per cent. bluestone solution. He had sown wheat pickled at that strength and also in a 1 per cent. solution; the latter had smut, whereas that pickled in 2 per cent. was free from disease. The 2 per cent. pickle did not appear to affect germination.

LIFE MEMBERSHIP.—The opportunity was taken of presenting to Mr. F. Masters a Life Member's Certificate of the Agricultural Bureau.

YEELANNA.

April 26th.—Present: 11 members.

CULTIVATION OF THE SOIL.—Mr. J. Harsmar read the following paper:—"All cultivated plants require water, air, food, and suitable soil temperature, and these factors are influenced by cultivation. It has been estimated that an average annual farm crop requires about 600 tons of water per acre, and this amount scarcely ever falls during the life of a plant. It must be stored during the months of winter and early spring, and the amount stored will be determined by the thoroughness and depth (or otherwise) of the ploughing and cultivation. Skim ploughing and shallow cultivation will not aid in the storing of moisture. Deep and thorough cultivation not only aid in the storing of moisture, but also assists in removing stagnant water, in the presence of which no farm plant can thrive. If there is an excess of moisture and it does not move freely through the soil, the necessary air can only penetrate in a limited quantity, and the temperature of the soil will be comparatively low. All plant food is dealt with, in the first place, by minute organisms with which the soil teems. But those organisms can only be beneficially active when the soil is thoroughly cultivated; indeed, the soil conditions that favor the plant also favor the organisms. Injurious substances in the soil are rendered neutral by the free admission of air, which is brought about by deep and thorough tillage. During the life of a plant its roots continue to spread and penetrate the soil in all directions, hence anything that improves the tilth will also benefit root growth. Plant roots have great penetrating powers, but when the soil is well cultivated the roots spread more easily, with the result that their supply of food is augmented. Good cultivation helps to put soil fertility in an accessible form. When the soil is rich and deep the fertility may be conserved for some time by ploughing just a little deeper for each fallow crop, but, generally speaking, where the nature of the subsoil permits ploughing to a good depth is the system adopted by successful farmers. The depth of the ploughing must always be regulated by the nature of the subsoil. During a wet season, such as we have experienced this year, the soil and subsoil become saturated with water, and during the dry, summer months the soil, unless it be loose or a sandy one, will often become caked, set very hard, crack, and soon dry out. With a good system of cultivation a large proportion of this water can be conserved below the surface soil, and it is from this reservoir that the plant draws its supply in the process of growth. With little or no cultivation, the moisture is soon evaporated and, to a large extent, lost to plant life. Every shower of rain brings with it a percentage of nitrogen in the form of nitric acid or ammonia, and if the soil is in good tilth the plant will benefit by this. On the other hand, if there is a hard surface, the nitrogenous matter, instead of penetrating down to root level, is washed away. It is also necessary to provide a good seed bed. It has been proved that loose earth does not provide the proper condition for root development. Roots thrive best in a well consolidated, but mellow bed, below a loose topsoil, yet having a direct connection with the subsoil in which the water is stored. Thoroughly carried out

with efficient implements the crop may be left to care for itself, the farmer being satisfied that whatever climatic conditions may be during the cropping period he has done all that is possible to give the crop a good start and to enable it to develop strong enough to withstand disease. More than that he cannot do; less than that he should not be satisfied with." In the discussion that followed, Mr. R. Wemyss did not favor deep cultivation where there were no weeds. He thought harrowing the fallow was better than cultivating. Mr. J. Cronin believed in thorough cultivation, followed by working the soil with heavy harrows. Mr. J. Wagner said on his class of land, which was sandy, the use of the harrows was sufficient cultivation.

MALTEE, April 25th.—Several subjects of local interest were brought before the meeting, and an interesting discussion ensued.

PETINA, March 22nd.—The subjects "Take-all" and "Stock Diseases" were brought before the meeting and an instructive discussion ensued.

STREAKY BAY, April 12th.—The Hon. Secretary (Mr. A. P. Kenny) read an article "Cost of Producing a Bushel of Wheat." A keen discussion followed, in which the majority of members contended that a price of 4s. per bushel was needed to make wheat-growing a profitable undertaking.

TALIA, April 12th.—Mr. C. T. Dolphin read an interesting paper, in which he gave the cost of shearing sheep with machines. Other matters of timely interest were also brought before the meeting for consideration.

EASTERN DISTRICT.

BRINKLEY.

March 27th.—Present: seven members and two visitors.

HARVEST REPORTS.—The following reports of grain and hay yields were supplied:—Messrs. E. W. Pearson & Sons, "Mortgage Lifter" oats on fallow dressed with 90lbs. of super, cut 1 ton of hay to the acre and yielded 18bush. of grain. Cape barley stripped 24bush. per acre; English malting, 15bush. per acre; Skinless, 8bush.; each variety was dressed with 90lbs. of super. Wheat on fallow with 90bush. of super per acre cut 2 tons per acre for hay. Several varieties of wheat averaged 15bush. per acre for grain. Peas yielded 21bush. per acre. Mr. A. W. Richards reported—Oats on cultivated grass land cut 1½ tons of hay per acre. Self-sown oats stripped 15bush. per acre. Wheat on stubble land dressed with 70lbs. of super returned 8½bush. to the acre. "Smut Proof" on new ground returned 10bush. to the acre. Mr. S. D. Marshall—Oats for hay, 15cwts. per acre. Wheat, "Major," on fallow dressed with 60lbs. of super, 18bush. "Buds" on fallow, 15bush. Barley, 18bush. per acre. Mr. H. A. Borchard—Oats on fallow dressed with 1cwt. of super cut 3 tons of hay to the acre. Cultivated grass land returned 1¾ tons of hay per acre. Wheat—"Major" on fallow dressed with 1cwt. of super per acre cut 2 tons of hay to the acre; "Smut Proof, 1½tons. "Major" on fallow yielded 33bush.; "Federation," 25bush.; "Smut Proof," 18bush. to the acre. Cultivated stubble land, dressed with 90lbs. super and sown with several varieties of wheat, stripped 14bush. to the acre.

BRINKLEY.

April 17th.

PIGS FOR PROFIT.—Mr. E. W. Pearson read the following paper:—"At the present time it can justly be claimed that the pig is one of the most profitable animals on the farm. There is, perhaps, no district in the State better suited for the profitable raising and marketing of pigs than ours. Not only have we a sure market at Murray Bridge, but the district is well suited for growing such grain crops as are most suitable for fattening pigs. Of these, peas and barley are the best. Peas grown in this district this season yielded from six bags to eight bags per acre, and barley about the same quantity, but if the difference in price is taken into consideration, peas at 6s. per bushel and barley at 3s., it will be found more profitable to make barley the staple food, with a feed of peas two or three

times a week for a change of diet. In feeding barley to pigs being prepared for market, the most profitable way is to crush the grain and soak it in water for at least six hours before feeding. If skim milk is obtainable add it to the crushed barley and it will make one of the best of feeds. Pigraising, like all other industries, needs to be worked on right lines if it is to become profitable. This can best be done by breeding the stock on the farm, and, as in all classes of livestock, the sire is of great importance. For raising bacon pigs, a pure bred Berkshire boar should be secured and mated with sows capable of producing good litters of pigs. Do not select a pure bred sow unless stud stock is required, because, as a rule, the grade sow will prove more prolific. The Berkshire-Tamworth cross is considered by bacon curers to be the ideal bacon pig. Breeding sows should be allowed plenty of exercise and, except when suckling a litter of pigs, they should

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have the range of a small paddock, where green feed can be grown to provide them with food to keep them in good store condition until a week before farrowing time, when they should be housed in a good, comfortable sty and fed on slop food. Do not allow the brood sow to become too fat or trouble is likely to occur at farrowing time. The young pigs should be weaned at the age of seven weeks or eight weeks. When taken off the mother they should be fed on milk with a little crushed grain added. Feed little and often for the first week, otherwise the growth of the young pigs may receive a check. If it is desired to fatten them quickly feed liberally three times a day. The question of exercise for fattening pigs is one on which opinions differ. Good results may be obtained by allowing the pigs to run in a large yard or paddock if they are provided with good, warm sleeping quarters. Certainly there is one point in favor of this method. It requires less labor to keep them clean. I prefer to keep them in the sty, say, six pigs or eight pigs in each sty. Experience with this method has proved, in my case, that they will fatten quickly and more than repay for the extra labor involved, and should be ready for market at from six months to seven months old and turn the scale at about 120lbs. dressed weight. Some feeders prefer to buy store pigs and fatten them instead of breeding. If this course is followed, do not select pigs less than three months or four months old unless plenty of milk is available. The pig that can be topped up with about two months' feeding will return a fair profit if the market remains steady, but, of course, there is always a chance of a drop in prices, and it is just here where I consider that the man who breeds has the advantage over the man who buys, because pigs at the present time can be reared to three months old on the farm for considerably less than their market value. Again, the man who starts out to buy in the open market generally has to buy his experience as well as his pigs. The experienced buyer will know at a glance whether the pigs offered for sale are likely to prove good 'doers' or otherwise. To those who are inexperienced in pigraising I would say always market the pigs in a finished condition. Many pens of good pigs are sacrificed in the markets because they needed just a little more feed. Never take them into the market with a full belly. The morning they are to be taken away do not feed at all. A drink of water if the weather is hot is all that is required."

GLOSSOP.

April 23rd.—Present: 35 members.

EFFICIENCY ON THE BLOCK.—Mr. Hatch read the following paper:—"The object of good management is to produce the maximum return of fruit, &c., and, at the same time, to keep the outlay down to a minimum and reduce unnecessary labor. A successful manager will be recognised by the appearance of his property, the general lay-out of the conveniences, and by the way in which he is regarded by the business people. Simply keeping the block clean and free from weeds, &c., is not alone evidence of good management. The problems that call for thought are—(1) The most successful treatment of the soil in regard to cultivation and manure; (2) the best method of pruning and training the vines; (3) the quickest and most economical method of harvesting the crops, at the same time preserving the highest quality of the product; (4) labor-saving devices and conveniences and the capital involved. One of the greatest problems is the soil, and there is no hard and fast rule for treatment, because the soil varies to such a degree that a method that would be successful in one class of soil would not do for others. For the greater portion of land in this area I regard as essential two ploughings yearly—winter and spring—with a third light summer ploughing if possible. A good subsoiling would be of immense benefit, but, as capital may not permit, the plough can be used as a substitute. In the absence of sufficient capital to procure gypsum, stable manure could be utilised on the worst portion of the block. Manuring to promote a good even growth and to produce heavy crops of good quality fruit is another question of individual soil requirements, but manuring is absolutely necessary. If the soil permits, I favor three or four cultivations as quickly as possible after an irrigation, followed by the harrows. If no rain falls, land treated in this way will be found quite moist at the next irrigation. If rain falls, the surface must again be broken. One fact stands out clearly, and that is that to protect the vines against burning it is necessary to cultivate more deeply. My observations of burnt vines show that this has been caused by a hard pan which

has not been broken, and which the water will not penetrate freely. It is advisable to have the ground in good condition before budding, thus lessening risk of loss through a dry spell. In manuring, one must always bear in mind that with most manures the full results are not obtained until the following season, therefore a good even growth must be promoted. The quality of the fruit should be better the first season. Watering is one of the main problems in this area, and here again the variability of the soils has to be considered. Some soils take water slowly, others quickly, and it behoves the blocker to practise methods suitable to his conditions and see that every vine has been watered. Go where you will, and it will be found that the man who has watered well has good returns, provided he has not neglected to cultivate. Drainage will have to be effected sooner or later, and the sooner the better, therefore secure maximum returns to enable drains to be laid down. Individual observation and judgment play an important part in the pruning and framing the vines, and the blocker has to study the vines and the treatment of the soil. Harvesting the crop, especially in a year such as has just been experienced, is certainly a proposition. In the first place, the settlers had but little experience, insufficient rack space, very little hessian, and small capital to work on, and on top of that a bad drying season to contend with. The lesson has, perhaps, been dearly bought, but blockers will now realise that sufficient rack space, plenty of hessian, sweat boxes and tins, &c., are essential. It pays to get the crop off as quickly as possible—one ton of spoilt sultanas would just about pay for a rack in one season. In handling the crop at the rack quite a number of improvements may be noted, especially as to labor-saving devices. Capital again plays the major part in the control of general improvements, but as soon as possible water should be laid on to all portions of the block. A small workshop for tools, with bench and vice, is needed, and a rain-proof shed near the green, in which to store fruit, will be required. The stables and sheds should be conveniently situated, strongly built, and in a warm position, and the implements should be kept under cover and given an occasional coat of paint. The harness should be kept dry and in good order, and the horses should be well treated. A

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man that tolerates a horse with sores or allows the animal to remain in poor condition is a mean individual. With proper care an acre of lucerne should keep two horses for about nine months of the year. Try to see that every inch of the block is producing to its utmost, utilise everything possible, and try to use judgment, thought, and foresight.''

MARAMA.

April 14th.—Present: nine members.

QUESTION BOX.—The meeting took the form of a ''Question Box,'' when the following questions were discussed:—''What is the best early and the best late wheat to grow in this district?'' Mr. W. Gray favored for early sowing, ''Early Gluyas'' and for late seeding ''Currawa.'' Mr. E. Tilly's choice was ''Late Gluyas'' for the early variety, and for late ''Currawa.'' Mr. G. Mills said that ''Queen Fan'' was the best early wheat, and ''Marshall's No. 3'' the best late. Mr. E. Greig said that ''Gluyas'' was a good early variety, and that ''Marshall's No. 3'' or ''Silver King'' were excellent late varieties. ''When is the best time to pickle wheat?'' Mr. Greig preferred pickling wheat the night before sowing, and Mr. J. Churches said the main point to consider was to see that the wheat was dry before seeding. Mr. Tilly favored pickling one year before sowing, and sowing the same wheat dry the next year, because he thought much of the grain was killed through pickling every year. ''What is the best variety of oats to grow for hay in this district?'' Mr. Gray preferred Algerian and Scotch Grey Mr. Mills favored Algerian. ''What is the best method to rid land of lignum?'' Mr. Gray said the only successful method was to keep sheep, so that the stock would eat the young lignum shoots when the plants appeared above the ground. ''What is the best thing to do with a piece of stubble ground that was not burnt. It has carried two wheat crops, and is at present growing a lot of shoots. Would it be advisable to rake off the straw and fallow it, or cut the shoots and use the fire rake during next summer, and would it be safe to then sow wheat?'' Mr. Tilly thought the best plan would be to cut the shoots so as to get an early burn next summer. Then summer fallow and sow with wheat. Mr. Mills said he would not like to risk wheat on such land, but would sow oats. Mr. Churches remarked that unless the burn was good, he would prefer to sow oats.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

March 22nd.—Present: 14 members.

DESTRUCTION OF MALLEE SHOOTS.—Mr. J. Harper read the following short paper:—''The best method of destroying mallee scrub is by continuous cropping until the shoots are destroyed. The first crop should be wheat, and if the stubble is not thick enough for a running fire, the fire rake should be used on very hot days to scorch the shoots. The second crop should be oats, and about 1½bush. to the acre sown in April should produce a stubble thick enough to account for most of the shoots. The land should then be fallowed and worked with a disc or skim plough and sown with wheat. If this practice is followed there will be no heavy losses from take-all. If the land is cropped with wheat three times in succession the crops were very liable to be attacked by take-all.'' In the discussion that ensued, one member said the running fire was better than the rake, but care should be taken that it travelled very slowly, it being only necessary to singe the shoots slightly, which was more effective than a quick burn.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

April 17th.—Present: 15 members and two visitors.

CARE OF SHEEP.—Mr. B. Schenscher read the following short paper:—''During the last few years the blowfly pest has been very troublesome. Much of this trouble has been due to neglect on the part of the owner, because if all carcasses were buried or burnt the flies would be kept under control and the death rate of the flocks would be decreased. Every farmer should crutch his sheep twice a year—the first time about March and the second just before shearing. Care should also be taken to see that the wool is removed from around the eyes of the sheep. Unless this is done the sheep are in danger of losing their sight, and will soon fall away in condition.'' The discussion that followed centred chiefly around the question,

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"Which is the best way to get rid of the blowfly?" One member said it would pay to burn or bury all sheep that died, and when destroying rabbits to do so with the fumigator. When sheep were blown, it was best to use benzine to kill the maggots. Others preferred Stockholm tar and kerosine. Others again said a weak solution of bluestone was most effective.

NEW RESIDENCE (Average annual rainfall 12.50in.).

April 16th.

OUTBUILDINGS ON THE FARM.—Mr. W. Schier contributed the following paper:—"Care should be taken when laying out farm outbuildings to erect them in a convenient position, say within 100yds. of the house. If possible, the sheds should always be built on ground where no water lies for any length of time. Some little space should be allowed between the stables and the implement sheds to act as a break in case of fire. When building the stables, care should be taken in selecting the posts. Do not use pine, on account of its susceptibility to dry rot. Jarrah or box wood will give the best results, and it is advisable to concrete them into the ground to prevent trouble from white ants. Straw roofs are not permanent, the stable should be covered with iron; the minimum height of the back and front of the roof should be not less than 12ft., so that the stables will not be too hot for the animals. A large yard adjoining the stables, and partitioned off into small yards, each yard holding two horses, should also be provided. The implement shed should also be covered with iron. Straw roofs, if allowed to get into a state of disrepair, allow the rain to leak on to the implements and vehicles. Both the stable and implement shed walls should be built of stone or concrete. The barn should be built of timber and iron to prevent trouble from mice and other vermin. To prevent mice getting in through the floor, the barn should be built about 3ft. above the ground. This can be done by building the barn on posts, and placing a piece of tin on the posts and nailing it down with the floor. The barn should measure at least 30ft. by 20ft., and be about 10ft. to 12ft. high. That will give plenty of room to provide for the storoge of corn and other perishable produce. The pigsty and fowl shed should be built about 150yds. away from other sheds, on account of lice. If possible, they should be built on the opposite side of the house. The stables and pigsty should be situated south-east or north-east from the house, because the wind does not blow for any length of time from those directions in this district." In the discussion that followed, Mr. A. Kassulke favored a straw roof, on account of it being warm in the winter and cool in the summer, and if a good roof were put on, and the straw covered with netting, it would last for many years. Mr. Klitcher favored iron roofs for implement sheds, on account of their being fireproof. Messrs. Klau, Tschirpig, and Foord also spoke.

PARILLA (Average annual rainfall, 16in. to 17in.).

February 15th.—Present: nine members.

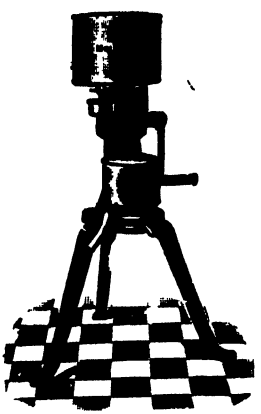
SUMMER FALLOWING.—The Hon. Secretary (Mr. C. S. Foale) contributed the following paper:—"February or March is about the time to work the land for summer fallow. Shallow working only is required, and some farmers even advocate the use of the cultivator only, and, judging by results, the practice is justified. About 1in. deep is sufficient to break the surface to allow the first rains to soak into the soil and not run off the surface into pools and crab holes as it does on unbroken land. Usually this land will require no more working until after seeding, but it must be cultivated immediately seeding is finished, otherwise the weeds will have too firm a hold and will require the plough to turn them under. A much firmer tilth can be obtained on summer fallow than winter fallow, there are no clods to break up, therefore a better seed bed is obtained. Another advantage with this practice is that a farmer can get ahead with some of his work, because cultivating only is required after seeding, which means that much more land can be worked in the time that it takes to fallow it in the ordinary way, and the job will probably be finished sooner, thus giving the horses more rest. A few farmers in this district have been summer fallowing for several years and their results prove that it is good. One particular case I have heard of gave a crop of over 30bush. per acre. But the greatest point in favor of the practice is that it prevents

take-all. It is worth doing, if for this alone. As time goes on and the advantages of summer fallow become more apparent I feel quite certain that it will become the general practice throughout the district."

PREPARATIONS FOR SEEDING.—At a further meeting held on March 21st, Mr. J. A. Mann read the following paper:—"Fallow should be well worked soon after ploughing is finished. First the land should be harrowed and then all the stumps and bushes picked off to give the cultivator a clear run. I do not favor working the land more than 2in. deep for the first cultivation after the harrows. After that, the land can be worked shallower should any weeds appear after the first working. Early fallow is essential for success in wheatgrowing. At the approach of seeding time, say, about the middle of May, give the fallow a cultivation before sowing the seed, and, if possible, a stroke with the harrows after the cultivating, and after that start sowing seed, but cross the first working and then harrow it again after drilling. In order to obtain a good germination of seed, good, early fallow, well worked, kept free from weeds, loose on top, and well packed underneath to preserve all moisture in the subsoil is essential. Grass land should be ploughed with the first rains that fall after harvest and then harrowed. Then it should be left until the fallow is put in. So soon as the fallow is sown, work the combine or cultivator on the ploughed grass land. If the paddock is very grassy give it two strokes with the cultivator, the first stroke will make a good seed bed, and the second will make a perfect job of sowing the seed and also a clean sweep of all weeds that have been left behind the first working. Finally, work the harrows to finish the job. New land that has just been rolled and burnt should be cultivated without delay, and then allowed to remain in a rough condition until seeding time. New land should be sown a fortnight earlier than fallow, so that the grain can start with the first rains. I favor an early wheat on new land." The paper created a good discussion.

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RAMCO.

March 17th.—Present: seven members.

EXPERIMENTS WITH SULTANAS.—The following paper was read by Mr. W. Green:—"Having cultivated sultanas for many years, and the results not being what I consider above a fair yield, I am experimenting to increase the yield, if possible, by different treatment of canes over a period of three years. Although manures have been constantly applied to these sultanas there has been no noticeable increase in their bearing propensities, nor is it the water that is applied, for the grade of the land varies from 2in. to 15in. in the chain. This season I have made four 1-acre plots as experiments and comparisons. So far two have been harvested. The vines in No. 1 plot were pruned in the third week in June. On an average six canes were left to each vine. They were twisted tightly around the wires without the nodes being cracked. They were topped and disbudded on November 5th, and cinctured on November 13th. The yield was 758 buckets or an average of 58 buckets to the row of 30 vines. The vines on No. 2 plot were pruned during the first week in July, with an average of six canes to the vine also. The canes were all cracked at the nodes, were topped and disbudded on November 6th, and cinctured on November 14th. This plot yielded 886 buckets or an average of 68 buckets to the row, an increase of 128 buckets over No. 1 plot."

WYNARKA.

March 19th.—Present: 10 members and three visitors.

SHEEP ON THE FARM.—In an address on this subject, Mr. A. Hood said he advocated fencing the land before putting sheep on the farm, because otherwise much time would be lost in searching for them. Provided feed was plentiful, four wire fences would be sufficient for Merinos. Crossbreds needed a better fence, but he did not think they were the best proposition. He favored a good class of Merino, plain faced, and possessing a good frame which denoted constitution. He had received good results from aged ewes. If possible, ewes in lamb should be secured. They should be crutched about two weeks after the first rain, because the green feed induced scouring and the flies were more troublesome then. Lambs could be tailed at about eight weeks of age. During shearing operations precautions should be taken to keep the wool free from cocky chaff, &c., because its presence would probably make a difference of pence per lb. If old sheep were kept they should be provided with good feed because an ewe with a poor milk supply would not protect the lamb, and so it became an easier prey to foxes, &c. He mated his sheep in January and February to secure lambs in June. With Merino rams 2 per cent. was sufficient, but if breeding Crossbreds more would be required. Sheep could be kept for wool growing or for lamb raising, and he favored the former because there was less work. One should take care to prevent overstocking. One sheep to 3 acres was sufficient, although limestone country that had been cleared some years might carry more. Water should be always available. The troughs should not be too large because the water would then not be so liable to become stale. He favored tailing short, and considered the best grasses in that district were spear and barley grass.

BARMERA, May 6th.—The Deputy Horticultural Instructor and Manager of the Berri Orchard (Mr. C. G. Savage) attended the meeting and delivered an address, "Pruning."

BERRI, April 23rd.—Mr. R. H. F. McIndoe, B.V.Sc. M.R.C.V.S. (officer of the Stock and Brands Department), attended the meeting and delivered an address, "Prevalent Complaints of Horses and Cattle." The final report of the Peter Wood Cup competition was also presented, which showed that Mr. W. M. Gillard was the winner with 95 points, and Messrs Thomas Halliday & Son second with 87 points.

COOMANDOOK, April 23rd.—Nine members and three visitors attended the April meeting, when the report of the Nunkeri and Yurgo experimental plots was read and discussed. An interesting talk also took place on the subject, "Subterranean Clover."

COONALPYN, April 17th.—A short address, "Experiences with the Tractor," was given by Mr. O. George. The speaker stated that sand seemed to be an obstacle to the machine, but it was able to negotiate the light soils with suitable grips. These, however, did not give the tractor the best power in hard soil. On the other hand, the tractor was faster than horses and enabled the implements to work closer to the fences.

GERANIUM, March 7th.—Mr. R. C. Scott (Experimentalist of the Roseworthy Agricultural College) delivered an address, "Cereal Culture," to an audience of 28 members and visitors.

LAMEROO, March 22nd.—Mr. C. R. Eime contributed a paper "Sand Drift." A keen discussion followed. It was thought advisable to remove all bushes, &c., that were growing against fences so that the sand would not collect and bury the wires.

MURRAY BRIDGE, February 18th.—Twenty members and a number of visitors attended the February meeting, when Mr. R. Cockburn delivered an address "Top Dressing Pastures."

MYPOLONGA, April 14th.—Mr. L. Rankine (Stock Inspector) delivered an address, "Tuberculosis and Meat Inspection." Seventeen members and six visitors attended the meeting.

NETHERTON, April 11th.—Several items of timely interest, including seed wheat, drilling, and working fallow land were brought before the meeting, and an interesting discussion ensued.

RAMCO, February 18th.—Mr. F. G. Rogers gave a short address "Observations during a Trip to the City." Referring to the matter of trellis posts, Mr. Rogers stated that he had seen the following plan put into operation:—With a post borer a 6in. hole was dug and filled with cement reinforced at the top, and into this was put a 1in. x ¼in. angle iron dropper. A piece of galvanized iron was then obtained and bent to form a frame. This was filled and the droppers placed in position, and when the mixture had set the frame could be taken away. The initial cost would possibly be greater on the river, but such posts would be everlasting. Cement was used in the proportion of 1 in 6, and very fine chips from the quarries were necessary.

SOUTH AND HILLS DISTRICT.

BLACKHEATH.

April 19th.—Present: 10 members and visitors.

SEEDING OPERATIONS.—Mr. H. Paech contributed the following paper:—"For at least three weeks before the commencement of seeding preparations, the horses should be stable fed at nights, well groomed in the mornings, and then, if not required, turned out during the day. Especially should this be done in districts where the horses are likely to pick up sand. During the time the horses are being prepared, all machinery required for seeding should be thoroughly overhauled, all worn parts replaced, accumulated dust and oil scraped or wiped off, and all bearings requiring it lubricated with oil and kerosene to loosen all gummed oil from the previous season. All wooden swings should consist of straight-grained stringybark or sheaoak, and D bolts used instead of eye bolts. All harness should be repaired and collars lined and well stuffed. The seed should be well cleaned and graded. This will assure an even sowing of the seed. Pickling plays an important part in the success of the crop, and whatever method of treating the grain is adopted, it is essential that the work be done thoroughly. After the weeds are up, the fallow should again be worked with the scarifier harrows, or a spring tooth cultivator, and then drilled with 1bush. or 1¼bush. of wheat, according to the variety sown. Early varieties require a thicker sowing than late varieties, say, about 1¼bush. to the acre and about 90lbs. to 100lbs. of 45 per cent. super. Finally, the fallow should be harrowed, all stiff ground well ploughed to a depth of 4in. or 5in., and then harrowed before and after the drill. It is better to put in less ground thoroughly than a large area carelessly. The land

should be grazed for about 3 or 4 years in between crops of wheat. When the wheat and oats have covered the ground and the soil is in a moist condition, the area required for hay should then be rolled. If, during seeding operations the horses are troubled with sore shoulders, apply medicated oil and double a clean bran bag and place it around the shoulders underneath the collar. When seeding is finished, all machinery should be placed under cover."

CYGNET RIVER.

April 15th.

POTATO GROWING.—The following paper was read by Mr. W. J. May:—"To secure heavy crops of potatoes it is necessary to obtain good seed. Each grower should select the seed at digging time from the tubers which have given the largest returns. All unshapely potatoes should be rejected. When cutting it is necessary first to remove the cluster of small eyes, which is usually found on one end of the tuber. The sett, when cut, should have, at the most, three eyes. After it is cut the seed should be sprinkled with wood ashes to stop bleeding, and, if necessary, it may then remain for a day or two before being planted. The ground should be well worked before the potatoes are planted. The setts should be spaced about 15in. apart in the row, one row of seed being placed in every fourth furrow, to allow for ample room for the horse cultivator to be worked. When the plants are about 6in. high the harrows should be run over the plot to check the growth of weeds. A dressing of stable manure and a light application of mineral super give satisfactory results. Planting earlier than September is undesirable unless the situation is free from frosts. When the plants are about two-thirds grown they should be earthed up. This will assist in keeping the potatoes free from wire worms, and will also keep them from exposure to the sun. The most popular varieties are 'Carmens,' and 'Up-to-Date,'; 'Snowflake' is a heavy cropper, and 'Red Skins' give a good return, but the tubers are not so large as some of the other varieties."

KANGARILLA.

March 21st.—Present: 13 members and visitors.

QUESTION BOX.—The meeting took the form of a "Question Box." The first question to be considered was, "What ointment is most suitable for a cow with sore teats?" Vaseline was recommended to keep the teats soft and so cause them to heal quickly. One member said an application of bi-carbonate of soda would give good results if a teat were cut. In the case of very sore teats, the speaker advised drying off the quarter and then working it back when the sore had healed. "What will remove warts from a cow's teats?" Castor oil was mentioned by one member as having the desired effect. "What is the difference between a Pomeroy and Cleopatra apple?" Some members stated that there was no difference, whilst others considered that they were two distinct apples. Mr. Biddle said that the Pomeroy apples growing in his garden, planted many years ago, were a different type from the present-day Cleopatra. "Which is the most suitable system of drainage on swampy land?" The majority of members preferred underground to surface drains. The former improved the soil, whilst the latter were an obstacle to working the land.

LONGWOOD (Average annual rainfall, 37in. to 38in.).

February 28th.

Captain S. A. White, C.M.B.O.U. (Vice-Chairman of the Advisory Board of Agriculture) attended the meeting and delivered an address, illustrated with lantern views, "Across Australia by Motor Car."

POTATO GROWING EXPERIMENTS.—Messrs. Lewis and Woolcock tended a report upon an experiment in potato growing conducted by them on behalf of the Branch to ascertain which of the nine varieties tested were the best for the district. The seed was presented by Mr. Joseph Johnson, and the sets were all planted on October 5th, 1923. They received the usual treatment which is given

to potatoes grown by members at this period of the year. Stable manure was dug in prior to planting the seed. The growing period was very favorable. Rain came at intervals, which was quite beneficial in producing good returns.

MR. R. H. A. LEWIS.

	Sets.	Yield. Lbs.	Ozs.
Connor's Up-to-Date	38	103	11
Factor	35	95	—
Early Manistee	25	53	6½
Scottish Triumph	34	67	12
Carmen No. 1	33	61	8
Brownell	19	27	—
Delaware	19	19	8
Bismark	35	54	—
Commonwealth	25	67	—
	263	548	13½

MR. WOOLCOCK.

	Sets.	Yield. Lbs.	Ozs.
Connor's Up-to-Date	40	102	8
Factor	40	93	—
Early Manistee	38	69	—
Scottish Triumph	38	93	8
Carmen No. 1	40	65	—
Brownell	30	39	8
Delaware	36	34	8
Bismark	32	88	8
Commonwealth	36	92	—
	330	677	8

The total area of land was about 4½ rods. All the labor was performed with hand tools. Mr. Lewis said some of the shoots were more developed than others on the day they were planted which probably had some influence upon the yield. "Up-to-Date," "Factor," "Scottish Triumph," and "Carmen" proved best for this district. Cooking tests were conducted by Mrs. Higgins and "Up-to-Date," "Manistee," "Scottish Triumph," and "Carmen No. 1" were highly spoken of.

At a meeting held at the homestead of Mr. W. H. Hughes on April 12th, the meeting discussed the results of the recent potato growing experiments.

McLAREN FLAT.

April 15th.—Present: 52 members and two visitors.

Mr. Liddiard read a paper "Pruning."

POULTRY FOODS AND FEEDING.—At a recent meeting the following paper was read by Mr. E. Butler:—"In dealing with this subject, I intend touching upon the most important branch of the poultry breeder's work. Given good stock, proper housing, and an up-to-date plant, success will not be attained by improper feeding, hence it is most important that the breeder should understand and master the correct feeding of the flock. It has been proved that the best foods are the cheapest, and many of the so-called cheap foods for fowls are at times not worth using. Grain or mill products that have been damaged to any extent has no feeding value. The aim of the feeder should be to use the foods that give a proper proportion of protein, fats, and carbo-hydrates. No two foods are alike in feeding value, so that it is necessary to mix foods to obtain a balanced ration. Protein is the name applied to substances containing nitrogen. This food constituent is necessary in all rations, because it assists in the formation of lean meat, blood, skin, and eggs. Carbo-hydrates is a term applied to a class of nutriments composed largely of starches and sugars. They furnish energy for the body, or are converted into fats and stored for future use. Fats, as the word denotes, include the oily portions of foods and perform much the same function

as carbo-hydrates. A balanced ration is a feed containing the proper proportions of protein, fats, and carbo-hydrates. Wheat.—The value of this grain is well known. It is important in feeding for egg production. Oats is a good food, but its value depends upon the quality of the grain and the amount of husk and fibre. Barley differs from wheat in that it has a hard, fibrous sheath around the kernel. For egg production it is not to be recommended, but it may be used for fattening purposes. Maize is a good food in cold weather, and may be used to advantage when cracked and mixed with other grain. Peas, like maize, make a good winter feed. Mill Products.—Bran and pollard are the stable products used in feeding, and vary in quality. A good sample of bran is flaky, and I favor a fine, white pollard for feeding purposes. Meat in some form is necessary, and specially prepared meat meals are always procurable. Green feed is a necessity, and any tender and succulent greens may be fed in season. Feeding for Egg Production.—This has been brought to a fine art, and different systems have been introduced into the poultry world. There are three methods of feeding mostly used by various breeders at the present time. No. 1. Morning, mash; mid-day, green feed; evening, grain. No. 2. Grain in the morning, green feed at mid-day, and mash at night. No. 3. Dry mash, with green feed and grain at mid-day and night respectively. These systems of feeding can apply to a person with a few head of poultry, or to a man who numbers his flock by the thousands, but what ever system is adopted it should be adhered to right from the start. A sudden change in feeding will probably cause a diminished egg yield, and at certain times of the year a moult may be the result. The system adopted by most of the breeders in South Australia is No. 1. The bulk of the work is done in the morning, that is, mixing and distributing the mash. The green feed at mid-day is quickly distributed, and the work at night—feeding the grain—can be quickly done. No. 2. Feeding grain in the morning and mash at night is favored by a very few breeders, the morning work is very light, and most of the time is taken up in the afternoon preparing and feeding the mash. No. 3. No morning work is required, because the dry mash is placed in specially constructed hoppers for the birds to get at will, and only mid-day and evening meals have to be fed. There are perhaps certain features in one of these systems that will appeal to the poultry-keeper, whether on a small or large scale, and a comparison will be beneficial. The birds are off their perches at daylight, busily engaged in scratching amongst the litter for any grain that may be left from the previous evening's meal. They have empty crops, and are eager for their morning feed, and when the mash is placed before them, they will be anxious for it. The mash, being hot, will give the birds a good start for the day, especially in the cold, winter months. This is quickly digested and in a few hours the soft food has passed from the crop into the body, and they are ready for the mid-day green feed. This is also quickly digested, and by feeding the grain at night, the birds take some time to find the grain in the litter, having to work for it, and go on to the perches warm with the exercise and having full crops. Grain takes longer to digest than soft food, and as it passes into the gizzard the juices and grit grind and soften it. With No. 2 system the wheat may be raked in after the birds have gone to roost, and as soon as daylight comes they can get their first meal. The mash at night is fed, and advocates of this system say that a higher egg production can be had, because the birds receive all that they can eat. No. 3. Dry mash. Here, there is no labor attached to mixing food every morning. So soon as the birds can see, they are at the troughs picking at the mash. This, to many of the breeders who have other work on hand, is a great saving of time, because enough dry mash can be mixed at one time to last the birds for a week. They also state that more birds can be managed by one man under this system, but for egg production, average results are not equal to the wet mash. There is also a grave danger of the flock becoming fat, as well as a certain amount of waste of food, caused by the birds picking out the tit-bits. A mash consists of bran, pollard, green feed, and meat meal. In making the mash, place the green feed in a trough and put on the bran, then pour boiling soup over it, mix it up well, and dry off with pollard. This, when mixed, should be crumbly, not too wet or too dry, because the birds will not eat it readily if it is on the dry side. In the feeding of a flock one has many classes of birds, and where one pen of, say, 100 birds will stand a highly concentrated mash, another pen may not need one so forcing, and care must be taken not to injure the hens by expecting too much from them. The quantity of mash fed cannot be laid down by any hard and fast rule. When the

birds are laying well they need a full supply, and will at times vary in the quantity they eat, but if a pen of birds is visited about 20 minutes after feeding the breeder can soon see by the state of the troughs whether more mash is needed, or whether too much has been fed. If more is needed it should be given, but care must be taken not to over feed. The quantity of grain to be fed to each bird is often a matter of discussion, and some have fed as much as 2oz. This is a point that the poultry breeder must find out for himself, but I favor 1½oz. If too much wheat is fed at night there is some left for the morning, and that means that the mash is not readily consumed. After the birds have perched for the night an examination of the litter will put the feeder right as to whether he has over fed, and if this proves to be the case the quantity should be reduced. The dangers of under feeding, perhaps through inexperience, are great. The birds are not getting the necessary food to keep up bodily strength, and have no food to convert into eggs, and with over feeding the organs cannot perform their duties properly when coated with fat, and it is only by close attention to the small details of feeding can the poultry-keeper hope to make poultry keep him."

MILANG.

January 12th.—Present: 20 members.

MOST PROFITABLE SHEEP FOR THE FARMER.—Mr. E. J. McLean read the following paper:—"Generally speaking, for a wet, cold district, the crossbred and Comeback are the most suitable sheep, while for the drier and warmer districts the Merino sheep is favored. In the first place, the sheepfarmer has to decide if he will produce wool, or direct his attention to raising wool and fat lambs. Breeding fat lambs for local or export markets is one of the most profitable branches of sheep-farming. Much might be said in favor of the Merino ewe for this purpose, such as being easy to control inside the fence, cutting a good fleece, &c., but the crossbred and Comeback ewe makes the better mother, and the lambs of that cross are more vigorous and sturdy than the pure-bred Merinos. The majority of

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lambs exported are crossbreds, the most populalr crosses being the Dorset Horn, Leicester, and Shropshire. These crosses mature more quickly than the Merino, and are, therefore, able to be placed on the early markets. The Dorset Horn mated with a Lincoln-Merino crossbred ewe or a close-woolled Comeback ewe is the best type for this district. A Comeback sheep is the progeny of a Merino ram mated with a crossbred ewe, that has an infusion of Merino blood. These ewes cut a very profitable fleece of wool, and the lambs are worth from 3s. to 5s. per head more at a certain age than lambs from Merino ewes mated to the same breed of rams. This is very important in a normal season, because the price of lambs often drops in the latter part of the season, while this year late lambs have brought higher prices than earlier ones. There are two reasons for this, one being the splendid late season for grass, enabling the farmer to finish the lambs off in very prime condition; and secondly, because of the excellent demand locally, and for export, which exists through a falling off in surplus due to the severity of the weather early in the winter. The light weight lambs of from 32lbs. to 38lbs. or 40lbs., are chiefly in demand. In all markets light lambs in good condition will always bring a better price per lb. than heavier ones. To produce good lambs for export, a farmer must not overstock, because ewes and lambs require an abundance of feed and good water. Lambs should not be dropped before May 1st, because of the uncertain rainfall, and once a lamb receives a check it never thrives. Lambs born early in May under favorable conditions will be fit for market by the middle of August, or a little later. For the man on the land who is prepared to give careful attention to the requirements of sheep, there is no other branch of farming to give such good returns with such a small yearly cost in management." Mr. McLean then gave an interesting description of the position of markets, and explained many of the technical terms used in the appraisement of the fleece.

MIXED FARMING.—At a further meeting, held on March 8th, the following paper was contributed by Mr. H. Pearson:—"The present and prospective price for wheat makes it clear that it is absolutely necessary that farming operations should not be confined to any one branch of agriculture if success is to be obtained. The first factors to be considered are the nature of the land and the rainfall. If starting on a new block, the laying out and subdivision of same is of the most importance. The homestead and farm buildings should be as near the centre of the holding as possible, with a race half a chain wide running right through the property, and with all paddocks opening into the race, to facilitate shifting the stock to the yards or from one paddock to the other. The size of the paddocks is another point of great importance. I think 100 acres should be the limit. and to those who are able, I advise having them half that size, with several small paddocks near the homestead for calves, pigs, &c., and, if possible, have water in every paddock. If the above plan can be adopted, a line of pipe laid down the race will meet all requirements. This system would apply to either a large or a small farm. Of course, in dealing with an improved farm, consideration must be given to existing conditions. Whilst I favor mixed farming, I recognise it is possible to adopt too many side lines. Consequently it is advisable to confine operations to a few of the staple industries that experience has proved to be suitable and profitable in the district. In this locality oats and barley should predominate, with a small area under wheat, and with a few small paddocks of rye or oats and barley mixed for early grazing. Mangolds is another crop worth trying, for given favorable conditions, I know of no other crop that will yield the same weight per acre. It should not be supposed, however, that a profitable crop will be grown without thorough cultivation and working into the land a very heavy coat of farmyard manure during the winter and early spring. and then applying about 3cwts. super. Sow the seed with the drill, but not with the super, that must be sown previously. The rows should be about 2ft. apart and kept well cultivated with a Planet Jr., and gradually thinned out as the plants develop, ultimately leaving them 12in. to 15in. apart. The thinnings make almost a crop in themselves, and are splendid feed for either cows or pigs, but they must be fed with dry feed, as they are very laxative. Another advantage is, if not needed for immediate use, they can be stacked until next year and still retain their nutritive qualities. A crop of mangolds averaging 6lbs. and set out 2ft. by 1ft. will yield 80 tons per acre. If dairying is contemplated, I

recommend growing a mixed crop of wheat, oats, and barley, or any mixture suitable for ensilage, which can be made in a stack if a silo is not available. Chaffed oaten hay and ensilagge make an ideal feed for cows, and the addition of crushed oats and bran will add to the value of the fodder. Sheep should be kept, if only to supply meat for the home, but if kept in large numbers they should follow the cows from one paddock to another. Pigs are a very profitable medium for converting corn, milk, and other products of the farm into cash, and whilst it is not probable that the present high prices will be permanent, a drop in prices can be experienced, and yet allow the farmer to feed barley at a profit. Good sties, proper forage, and good breeding stock, however, are indispensible to success. A vegetable garden is also worthy of consideration if a suitable site can be obtained. Good poultry are also worth keeping, but they should not be allowed to have the run of the horse mangers and roost on the implements."

MOUNT PLEASANT (Average annual rainfall 26.87in.).

April 11th.—Present: seven members.

Mr. V. R. Tapscott read a paper, "Modern Methods on the Farm," and a discussion followed in which Mr. E. J. Tapscott strongllly favored the Jersey cow as compared with the Shorthorn. He said that although with the Jersey one would not have so much skim milk for feeding pigs, it would be found that the lactation period of the Shorthorn was considerably shorter than the Jersey, and that the Shorthorn required more feed than the Jersey. Mr. V. R. Tapscott considered that any cow of a dairy breed, if properly fed, would prove profitable. The question of in-breeding was also dealt with by Mr. V. R. Tapscott. Mr. V. R. Tapscott tabled a plant which he said was a cross between turnip red beet and silver beet. He said that it was good for feeding cattle and could also be used for the table, both as red beet and as silver beet. Mr. Tapscott also showed samples of Blue Wonder beans, a new variety. Mr. E. J. Tapscott asked whether super could be used with advantage when growing cabbages, &c. The general opinion was that super should not be used during hot, dry weather, but would give good results when the weather was cool and damp.

RAPID BAY.

April 12th.—Present: 25 members.

DESTRUCTION OF FOXES.—Mr. L. Morris read the following paper:—"Foxes are becoming more numerous every year, and every year more difficult to poison. In this district there are three ways of destroying these pests—poisoning, catching with dogs and shooting, and trapping. Of these I favor poisoning. Farmers who lay poison and do not trouble about the skins should commence to set baits in February, because the young foxes are big enough to travel and are more readily poisoned than later in the season. The main points in poisoning are to have a good trail and suitable baits. For a trail the large stomach of the sheep is the best I have tried, and for baits raw rabbit or rosella parrots and mice have given good results. It is also a good plan to place baits in a stubble paddock that the foxes have been in the habit of visiting in search of food. It is not advisable to poison the whole carcass of a sheep, because the bones are dangerous to stock as well as dogs. Just as good a result will be obtained, if a sheep is killed by foxes, by cutting off small pieces of meat, care being taken not to handle the baits, and burying them within a few yards of the sheep. The smaller the bait the more likely the fox is to eat it. Always bury the baits so that they are not taken by birds. For poisoning I have always used crystal strychnine with good results, but now that foxes are becoming more difficult to poison I suggest the use of cyanide of potassium, because after baits treated with it have been out in the paddock for two or three days they become harmless and dogs can be taken where the baits are laid with perfect safety. Many farmers object to dogs being taken on their land in lambing time, but I think good dogs would kill more foxes than would pay for the lambs that were lost. About June and July, when the foxes are mating, it is almost impossible to poison them, and that is the time when dogs are the best means of destruction. for the foxes, as a rule, travel during the day and night. If by any means a vixen can be poisoned during mating season, it is a good plan to put down a fresh bait in the same place, for as foxes travel in pairs, the dog is almost certain to come back in search of its mate. As a rule,

after mating season is over, foxes can be poisoned easily for a few weeks until the vixens disappear to be seen no more for several months. Trapping foxes is not favored in this district, but if care and patience are exercised quite a number of foxes can be destroyed. The first thing to do is to find a place suited for the purpose, a forked log or a hollow stump, with an opening on one side so that the bait, unpoisoned, of course, can be buried where it can be only approached from one way; the traps should be buried deeply and set in wet weather for the best results to be obtained. A trap which is set for a fox should never be pinned securely, but should be wired to an old plough share or something that will give when the fox pulls, otherwise it will pull off its foot and escape. I favor the ordinary rabbit trap in preference to the fox or dog trap for the reason that the former are not so clumsy to set nor so much trouble to cover. It is always a good plan to take the carcass of the fox, if it has been poisoned or trapped, away so that it cannot be seen or smelled by other foxes. Referring again to poisoning, there are other baits which can be used under different circumstances. For instance, foxes eat fruit and can be poisoned in an old garden, but care should be taken that no stock can get in to pick up the fruit which falls to the ground. The orchard should be visited in the evening and all pieces of fruit on the ground picked up, except two or three which can be poisoned, care being taken to mark the poisoned fruit so that it will be known if more fruit falls and is not taken. Cream if set on a fine night where a young lamb has been killed is almost sure to poison the fox which killed the animal. Take the dead lamb away and set the cream in the same place." In the discussion that followed, a visitor asked if anyone had tried poisoning the traps, and he explained that it had been found very successful in the North. The method was to tie a strip of rag around the jaws of the trap and insert strychnine in the rag and when the fox got caught it would bite at the trap and get strychnine from the rag.

ROCKWOOD.

March 17th.—Present: nine members.

THE FARM GARDEN.—Mr. L. Neighbour read the following paper:—"The farm garden should be conveniently situated close to the homestead, and, if possible, should have a water supply for summer use. A well drained piece of ground is necessary in this district owing to the heavy winter rainfall, and for this reason I do not think summer vegetables could be grown very successfully without irrigation. During the time prior to seeding, the manure from the stables, cowyards, and fowl runs could be carted on to the garden and ploughed in ready for planting with the first rains. The manure should be well rotted to avoid weeds, and should be spread to a depth of at least 3in. It is a good plan to manure half of the garden heavily each year, using that portion for cabbage, cauliflowers, lettuce, and other plants requiring heavy feeding. The remaining portion could be dressed with superphosphate at the rate of about 5cwts. per acre. Turnips, red beet, carrots, and parsnips could be planted in this part of the garden, but in the case of carrots and parsnips, the super should be well worked into the soil some weeks before planting to avoid mis-shapen root crops. Seed of cabbages, cauliflowers, lettuce, &c., for transplanting should be sown thinly in fairly rich soil, but should not be forced. A well grown, sturdy plant will not feel the shifting nearly so much as a spindly plant. When transplanting, holes should be made for the plants and filled with water unless the soil is very damp. This will be found to answer better than watering after the plants are put in. The hoe should be kept going whether weeds make their appearance or not, because a well worked surface helps to keep the plant healthy. When the plants commence to turn in they will benefit by a top dressing with a mixture of super, five parts; blood manure, three parts; sulphate of potash, two parts, applied at the rate of 4ozs. or 5ozs. to the square yard. This should be hoed in and will act quickly when the soil is in a nice moist condition. Cabbage moth and aphis may be found troublesome during the summer and early autumn. These can be checked to a certain extent by destroying or removing all decaying leaves of cabbages which have been cut. If these leaves are left to rot on the stump they will form breeding grounds for the pests. All vacant ground should be dug over and left rough if not required for immediate use. It is a mistake to allow weeds to overrun any portion of the garden, because the seeds of some of the noxious plants will retain

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their germinating powers for many years and cause endless toil, which may be prevented if they are taken in time. Carrots, parsnips, turnips, swedes, red beet, onions, &c., should be planted in rows about 1ft. apart and the seed sown thinly. When the rows can be seen the Dutch hoe should be run between them, and as soon as the plants are large enough to handle, they should be hand weeded and thinned out. Plenty of space should be given if good results are desired. Three inches is sufficient for carrots; 4in. for turnips, red beet, and onions; 4in. to 6in. for parsnips; and 6in. to 8in. for swedes. Grown in this way the plants may generally be pulled as they come without searching for the best, because when they are grown thickly they will grow more quickly, and the ground may be ready for the next crop a week or so earlier, which is often very important. Potatoes, onions, and any of the melon tribe will follow well on the heavily manured portion of the garden, but should have a dressing of super as well. To get the best results from pumpkins, cucumbers, and other members of that family, the ground should be deeply trenched. Throw off the top soil to a spade depth and dig a good quantity of manure into the next spit, afterwards returning the top soil, well mixed with manure. On the artificially manured portion, French beans, peas, and tomatoes should follow. For tomatoes, I use a pound or two of well rotted farmyard manure to each plant, afterwards top dressing with the mixture recommended for cabbages. If the plants are growing well, the top dressing should not be applied until the fruit has set. A second dressing may be applied later if necessary. Tomatoes may be pruned to a single stem by pinching out the laterals as they appear; the plants will require tying to stakes if this method is adopted. This method encourages the early formation of fruit and more plants can be grown on the ground. Three feet between the rows and 2ft. between plants is sufficient for staked tomatoes and 4ft. by 3ft. will be required for the bush method. French beans require a fair quantity of manure. Good results will be obtained by covering the seed with a couple of inches of well rotted farmyard manure and giving also a sprinkling of super. The beans will crop for several weeks if picked frequently and well irrigated once a week. Peas do well with less irrigation than most summer vegetables, and should be well drained if grown in winter. Manuring the rows as with French beans is also beneficial to peas. Thorough cultivation, both before and after planting, is essential if good results are desired in the garden, so that all vegetables should be planted with sufficient space between the rows to allow for cultivation until they are well grown. Constant attention is required to keep the garden in order. Weeds should never be allowed to grow, but should be prevented by constantly stirring the surface soil, thus killing them as they germinate. Finally, for the farmer who desires remunerative recreation, there is nothing better than the farm garden."

SHOAL BAY.

March 31st.—Present: 12 members and two visitors.

COLT BREAKING.—Mr. K. Bates, who read a paper dealing with this subject, said the first thing that was necessary for colt breaking was a strong yard, and next sound gear. A rope and pole were necessary to catch the colt and bring it up to a secure post. Next a leather halter should be placed on the colt and the bit inserted in its mouth. On no account should winkers be placed on the colt whilst it was being handled. Then a rope could be fixed to the bit and a surcingle buckled on tightly, tying each end of the ropes on each side of the bit to the surcingle sufficiently tightly to arch the neck. That tackle could be left on for the best part of the day, and the colt would gradually mouth itself. The second day the colt should be caught. Special care should be taken to see that it did not break away. After proper fitting harness had been chosen, the colt should be put in a hand roller to teach it to walk straight. After that the colt should be ready for the body of the team. Care should be taken not to overwork the young horse for the first few days, because if that were done it would make a slow and sluggish horse. After working the shoulders should be washed with salt water to harden the skin and minimise the danger of sore shoulders. A wet bran bag put under the collar also prevented the shoulders from scalding.

SHOAL BAY.

April 17th.—Present: 17 members and one visitor.

FENCES ON THE FARM.—Mr. S. Bell, who read a paper dealing with this subject, said if the fences on the holding were not kept in good order the farmer could expect trouble with his own and neighboring stock. The boundary fence should be made of good gum posts, 2ft. in the ground and 3ft. 9in. high with six plain No. 8 wires and a barb on top. Good stockyards were a necessary part of the farm equipment. The horseyard should be built of gum posts and rails. The posts should be 2ft. 6in. in the ground and 4ft. 6in. above the surface, with two rails, one on the top of the other 2ft. 6in. off the ground. There should be one plain wire between the rails and one underneath. The sheepyards could be made of gum posts, pig netting, and four No. 8 plain wires, to which the netting could be tied, and a barb wire on the top of the post. The fence should be at least 4ft. high and the posts 2ft. in the ground. The gates should be made of sawn stringybark swung on good hinges and fastened with an iron hook so that it could be opened and shut easily.

TWEEDVALE.

March 20th.—Present: 15 members and three visitors.

ENSILAGE.—Mr. E. S. Miller contributed the following paper on this subject:—"It is surprising to note that, although the first silo to be built in the Commonwealth was erected in South Australia, the farmers in this State are far behind those of Victoria and New South Wales in realising the importance of the silo as a means of conserving fodder. Ensilage making has now passed the experimental stage, and many farmers in all parts of the world rely almost entirely on ensilage fodder in times of drought. It stands alone as an insurance against drought, and in a district like this where we have feed in abundance for a few months of the year and then practically nothing for the remainder, I think no dairyman can afford to be without a silo. It supplies fodder that is most needed in the late summer and autumn, when a moist, juicy food is required to stimulate the milk flow of the cows. Compared with roots its feeding value is great, as the following table will show:—Mangolds (which are considered the most valuable fodder we have in the Tweedvale district), contain 88 per cent. of moisture, whereas lucerne and rye grass contain 58 per cent; fibre shows under 1 per cent. in mangolds against 13½ per cent. in silage; albumenoids, 1 per cent. against 6 per cent.; fats, 1/10 per cent. against over 2 per cent.; ash, less than 1 per cent. against 5 per cent.; carbohydrates (sugar and starches) shows 15.20 against 9.40; the digestible food in mangolds shows 10.50 against 23.33 in ensilage. Every particle of herbage upon farms may, if necessary, be utilised for silage, even weeds, thistles, and nettles having been successfully employed. The leaves and shoots of many kinds of trees may also be ensilaged. If the material is too coarse for actual silage, it may be useful for topping up the silos, stacks, or clamps. Coarse grass in meadows, pastures, and under trees in orchards and elsewhere, which stock frequently reject, may be made into silage. Sudan grass, lucerne and clover, hop vines, vetches, Italian rye grass, maize, sorghum, and such like fodder, all cereals, especially if mixed with leguminous fodder such as lucerne, beans, &c., make excellent silage, but the best crop is reaped from a sowing of 2bush. of oats, 8lbs. of vetches, and 20lbs. of peas to the acre. Leguminous fodder should always be mixed with cereals. In America, where there are over 400,000 silos with an average capacity of nearly 80 tons, the most important silage crop is maize, which is roughly chaffed and in some instances employed uncut. I wish to especially emphasise the fact that, although cows ravenously eat silage which is made from thistles, weeds, and such like material, it must be remembered that the better the fodder put in the better will be the outturn. Ensilage is the name given to green, succulent vegetation conserved either in pits or in overground silos under conditions which do not permit the air to penetrate the bulk of the material, in fact, the success of the process depends upon the expulsion of air from the mass. When we put green stuff into a heap we find that in a short time there is a considerable rise in temperature due to biological and chemical changes in the plant cells. The work of rendering the green stuff more easily digestible is carried on by ferments and bacteria, which are present in countless numbers on the plants. A few days after the stuff is put into a silo a pleasant aroma will be

noticed. This is due to the formation of lactic and acetic acid, and unless the action of these acids is properly controlled by the expulsion of air from the mass the result will be failure. Anyone, however, can make good ensilage if sufficient care is exercised. Palatability and succulence in the food ration are essentials to deep milk yields, health of the cattle, and success in stockraising, but in few countries is dairying so subject to hot and dry conditions during the summer months as in South Australia, nor so short of food supply during the cold weather, especially in our hills district. Ensilage making should, therefore, appeal to all. Succulence and palatability supplied to milch cows in England in the shape of root crops cannot so readily be secured in this State, therefore we must have recourse to other methods, and the only one which will be successful all the year round is properly managed ensilage. I feel almost convinced that lack of succulence in the feed is responsible for that common and dreadful complaint which carries off so many of our dairy cows, and is known as "dry bible," impaction, or paralysis. For green crops ensilage has many indisputable advantages over hay, the chief being immunity from fire and vermin of any description. It will keep indefinitely without any depreciation in value, and is always ready for immediate use. It is a far more valuable fodder for milking cows than hay because it has a favorable influence on the milch cow. The crop intended for ensilage is more easily secured than the hay crop, because it can be cut and carted straight into the silo in any sort of weather, whereas with hay there is the worry of getting suitable weather for cutting, stooking, carting, and stacking. In order to obtain the maximum food value in any crop grown for silage, the crop must be cut when it contains roughly 75 per cent. of moisture. Where cereals are grown with leguminous plants it is well to cut the crop with a reaper and binder and put it through a chaffcutter into a pit. It is a good plan to sprinkle coarse salt evenly over the surface of the green chaffed ensilage at intervals of every 3ft. There are four different kinds of silos—stack, clamp, pit, and overhead. Consideration must be given to local conditions in order to decide which method of construction is to be adopted. I feel confident that the silo most suitable for this district is the pit silo, because there is not so much heavy handling as in overground silos. The pit silo, if possible, should be constructed in the side of a hill. I favor a pit of about 13ft. square, or, if round, about that diameter and 15ft. deep, which will hold enough ensilage to feed 20 cows for about four months, that is, allowing each cow one cubic foot per day, or in weight, 40lbs. or 45lbs. Build the silo of brick and cement it over. If square, round off the corners to enable the fodder to be well tramped, which is a most important factor in making good ensilage. Have a door frame built in the lower side where slabs can be fitted one above the other till the frame is completely filled in. When this is done paste sheets of unbleached calico on the slabs to prevent air getting between them. A sliding roof is also a good idea, because it can readily be moved during filling and pushed back afterwards. The best plan in filling overground silos is to chaff the material and have an elevator to raise it from the cutter to the top of the silo. Great care must be taken in filling. As it falls from the elevator, the heavier portions of the green chaff will accumulate in the centre, gradually forming a cone, the result is uneven shrinkage and subsequent waste owing to the air not being properly excluded. From 8ft. to 12ft. per day should be put into the silo. When full, leave it for a day to settle, then fill up again. As with a pit, select the greenest of the crop for the top layers. After the top has been made even, cover it with tarred paper or bags and add weights or material, such as earth, stones, sand, or bricks, piled on planks or boards. To make sweet silage, the silo should be filled slowly to ensure a temperature of well over 100 deg., which neutralises the acid fermentation. A simple way to test the temperature is to push a piece of iron into the mass and leave it there for a while; the iron must not be too hot to hold when drawn out, nor only just warm. To cool the silage tramp it well, and to make it warmer leave off carting for a day or two. Manufacturing stack silage costs very little, there being no chaffing or special construction. One great drawback is the enormous waste which occurs on the outside of the stacks owing to the air penetrating to a considerable depth. These stacks are made in the same way as ordinary haystacks. It is important to have great and regular pressure. Several methods of pressure as by chain, hydraulic presses, and lever appliances have been patented. A little attention is necessary for a day or two to see that it goes down without cracking.

Materials for making the silage stack should be used whole as a rule and carted immediately after cutting. Dry earth may be spread directly on the ensilage or on intervening sheets of corrugated iron, felt, &c. In this case no other covering will be necessary. Clamps are simple and inexpensive receptacles for the green crops which I have enumerated above. They are advocated by practical men as most valuable in times of emergency, and some stockowners prefer to adopt them." The paper then described this method of making silage. "Opinions differ as to how quickly a silo should be filled. Ensilage can be fed at any time after six weeks from being filled, but it takes about three months or four months before complete fermentation has taken place. When feeding cows, it is well to remember that ensilage taints milk, not through the cow, but through the air, so it is as well to feed it at a distance from the cowshed or handle it carefully in the sheds Roughly, the cost of cutting, carting, and filling is only about 3s. or 4s. per ton. The weight required for pits 14ft. deep should not be less than 3cwts. or 4cwts. per cubic yard, and for overground 25ft. high, only about 2cwts. per cubic yard is required. The pit silo which I have recommended for this district will cost about £65. If wood and iron are used the cost is much less than brick, stone, or concrete, but no doubt concrete is the cheapest in the long run. Iron must be tarred to guard against the acids of the ensilage, or even whitewashing will suffice."

TWEEDVALE

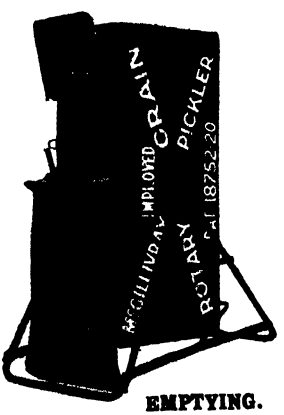
April 14th.—Present: 25 members and visitors

TOMATO CULTURE.—Mr. E. W Dearman read the following paper:—"The most important point in the cultivation of tomatoes is the selection of the soil. It should not be too rich, because such soil tends to make too much stalk growth, to the detriment of the fruit. Tomatoes will also be more liable to disease in rich soil than in sandy soil. The plants should be sheltered from frost and

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cold winds, and, if possible, they should always be planted on the north side of a hill, in order to get as much sun as possible. In preparing the seed bed, it should be well drained. To do this the best plan is to bank it up several feet with stable manure. The seed should be sown very shallow, about the end of August, and it is advisable to sprinkle a little water over the seed occasionally. Some growers prefer putting glass over the seed to make them grow more quickly, but plants grown under glass are more delicate than those raised in the open. It is a good plan to transplant the seedlings again in another bed several inches apart, to encourage them to make stronger growth. This will also make the roots grow several inches up the stem, with the result that they will make better progress when planted in the field. Planting out should be done not later than November. In planting on a large scale, I prefer to place the plants about 4ft. apart each way, which leaves enough room to work the soil with a horse and scuffler. If the weather should be very warm when planting out, it is best to provide a shelter of bracken fern. The plants should receive very little water until the first fruit sets, and from then onwards irrigations can be applied. A strip of about 10ft. or 12ft. should be left every chain in order to provide sufficient room to get through with a horse and vehicle. Staking is no doubt a good plan, but generally growers have not got the time to do it. To grow tomatoes successfully, pruning is the most essential part, otherwise the plants make too much growth, with the result that the fruit will not set. Pruning should be carried out at least three times during the season. As to varieties, 'Early Dwarf Red' is the earliest, but it is not well shaped, and is also too hollow and too soft for packing, it would not be advisable to plant this sort on a large scale. 'Ponderosa' has a very smooth skin, it is rather a shy bearer, liable to crack, and has very thin skin. 'Burwood's Prize' is, no doubt, the best tomato; it is beautifully shaped, grows to a large size, the skin very rarely cracks, and it is a good carrying tomato."

ALDINGA, April 16th.—Mr. H. L. Stanfield read a paper "Tractor *v.* Horses," and a good discussion followed.

BLACKHEATH, March 21st.—Present: seven members and two visitors.—Mr. E. T. Pym read an extract from the *Journal of Agriculture* entitled "The Care of the Flock," which was followed by a lengthy discussion.

BLACKWOOD, March 17th.—"Cider and Vinegar Making" formed the subject of an address given by Mr. D. G. Quinn (Viticultural Instructor at Roseworthy Agricultural College) to a well attended meeting of members and visitors.

CHERRY GARDENS, April 15th.—During the afternoon 10 members of the Branch and 20 visitors made an inspection of the orchard and vegetable garden on the property of Mr. C. Ricks. Afternoon tea was provided by Mrs. Ricks. In the evening the usual business meeting was held.

CHERRY GARDENS, May 13th.—Fourteen members attended the May meeting which took the form of a "Debate" evening. Several subjects of local interest were brought forward and debated by Messrs. C. Ricks, M. Basey, H. and L. Strange, J. Lewis, and H. Jacobs.

CURRENCY CREEK, March 21st.—Mr. P. H. Plummer read an interesting paper, "Take-all," and an instructive discussion followed.

PORT ELLIOT, March 19th.—A lengthy discussion took place on the proposal to form a local branch of the Dairymen's Association. Other matters brought forward for consideration were "Shelter for Stock" and "Rabbit Destruction."

PORT ELLIOT, April 16th.—The Hon. Secretary (Mr. H. B. Welch) read extracts from the *Journal of Agriculture*, "Planting Pines on Stock Reserves." Members then discussed the subjects, "Planting Pines" and "Poisoning Rabbits."

STRATHALBYN.—*Noxious Weeds.*—That legislation at present in force in respect to the destruction of noxious weeds was failing in its object was urged by Mr. S. Bottrill, who, in the course of a paper, referred to the large number of undesirable plants that had been introduced into the State during recent years. He gave local instances of the introduction and spread of weeds, and suggested that

had they been dealt with when they first made their appearance, they could have been eradicated. Dealing with the suggestion that horehound should be proclaimed a noxious weed, Mr. Bottrill said:—"It would be a great injustice to landowners who have none growing on their land (because their cattle will not let it grow), and where it is so valuable in keeping stock in good health, to be compelled to clear the roads adjoining their holdings. I noticed last year that in the north landowners were heavily fined for neglecting to destroy the stemless white horse thistle, but if it had grown in that district when I was there in drought time, it would have been a God-send to starving stock, because there are but few better milk and cream producing plants. On account of its prickly nature, however, it requires cutting so that stock can start at the butt end. When it is dry sheep will fatten on the seeds, while the leaves act as a fertiliser for the land. Bathurst burr is one of the worst weeds; it is useless as fodder and the burrs reduce the value of wool every year to a considerable extent, and travelling sheep spread it in all directions. There are a large number of objectionable weeds and plants, and their destruction is a hard problem to solve. Owners and occupiers of land should do their best to keep the land clean instead of waiting for the law to compel them to do so."

SOUTH-EAST DISTRICT.

ALLANDALE EAST.

April 11th.

SHEEP MANAGEMENT.—Mr. T. H. Earl, who read a paper dealing with this subject, said he wished to confine his remarks on sheep raising to conditions that obtained in the Allandale district. In his opinion they had neither the quantity nor the quantity of feed to raise lambs for freezing, therefore his energies had been confined to raising sheep for wool. The ideal sheep he considered to be the Comeback. For the farmer starting a flock he recommended buying four or six tooth crossbred ewes of even size and placing them with a good Merino ram as free from wrinkles as possible. The lambs from that cross were hardy, grew to a fair size, and carried a good fleece of wool which realised a good price in the market. Another good type of sheep for their district was the first cross—from Merino ewes joined with a Lincoln ram. Those sheep were cleaner pointed than the Comeback, the wool was of better length, and they grew a very good carcass when allowed to mature. The time to join rams with the ewes was a very debatable question. Last year was an exceptionally bad year for lambs, feed was short, foxes were plentiful, and weather conditions unsuitable. His flock began to lamb in June, and the lambs that did live through the bad season were small and stunted and made slow growth. Those that came later, when the feed began to grow, did much better, and with them very few losses were experienced. This year he had arranged so that lambing would not commence until about the middle of August. It might be argued that late lambs would not cut so much wool, but the fact that a better percentage would be obtained would make up for that deficiency. At shearing time there was usually plenty of feed and the sheep required little attention until the commencement of the dry weather. If possible, water should be provided in all the paddocks, but if the sheep had to be watered, a drink every two days should be sufficient. A piece of rock salt placed in a box or trough near the watering place would keep the animals in good health, and a change to the stubble paddock should put them in good, fat condition by dipping time. On account of the bad season last year tick was more prevalent than usual, but he believed that if sheep were thoroughly dipped in a suitable preparation, mixed according to directions, and kept in good condition, there would be very few losses from ticks. All sheep, especially ewes in lamb, should be crutched as soon as the first young grass began to appear. The wool saved would pay for the trouble, and the sheep would not need so much trimming through the winter. It was a good plan to have an old pair of shears at the sheep-yard, so that when the sheep were yarded the dags could be trimmed off before

too much wool was spoiled. Ewes in lamb should be separated from dry sheep if possible. Dry sheep travelled about more than ewes in lamb, and if the latter were younger than four tooth, they were liable to leave their lambs in order to keep up with the rest of the flock. If the ewe left her lamb she could be placed in a small paddock with a couple of others, when she would in all probability mother it. Ewes in good, strong condition did not have any difficulty in lambing as a rule, but if the occasion should arise the head and forelegs should be drawn gently down until the shoulders appeared, and the ewe allowed to go; next time she strained the lamb would come easily. Opinions differed as to the age at which lambs should be marked, but he thought a fortnight was quite old enough. Should the lambs be late and a few flies about, a 6lb. jam tin full of water should be obtained and a tablespoonful of phenyle mixed with the water. That dabbed on with a brush made by tying a piece of wool on a stick would help to heal the cuts and keep the flies from striking. Should a sheep or lamb get in a trap and its leg be broken, but the bone did not protrude through the skin, its life could be saved by splinting the leg with a piece of bark or hard leather. If the foot had been trapped a swelling would appear in two or three days. The swelling should be opened and washed in an antiseptic solution, otherwise it would lead to blood poisoning. That might seem rather much trouble, but at the present time a live sheep was a valuable asset to the farmer.

MOUNT GAMBIER (Average annual rainfall, 32in.).
April 12th.

CARE OF THE ORCHARD.—Mr. H. H. Orchard (Instructor and Inspector for the South-East) read the following paper:—"At the present time there is work that can be done that will materially assist in suppressing diseases and pests. Firstly, there are the windfalls and diseased fruits which should not be left under the trees to rot; such a practice, apart from the unsightly appearance, can only be conducive to the spread of pests. The fruit should be gathered as soon as possible, and, if intended for the pigs, thrown into the water at once and allowed to soak for 24 hours before being fed. The custom of feeding diseased fruit directly to stock is very little better than allowing it to remain under the trees, for in either case the pest has time to leave the fruit and seek shelter. Failing soaking, the fruit should be burnt or buried. At the same time a good, thorough spraying applied when required, will obviate the necessity for much of this work. Also, there is nothing to be gained by storing windfalls or disease infested fruit; it will not keep any length of time, and whilst in storage the pest is permitted to find a safe shelter about the building wherein to winter, only to emerge again in the spring and proceed with its destructive work. The leaves from beneath the trees should be raked together and burnt. In this way many spores or germinating cells of fungoid diseases, such as peach leaf curl, shothole, and scab of the apricot, will be destroyed. This practice of burning, worked in conjunction with a fungicide spray, such as Bordeaux mixture, will effectively deal with fungoid diseases. Following the harvesting of the crop it is as well to stir up the surface around the trees thoroughly for the tramping occasioned in gathering will on doubt have consolidated the ground. There are many trees in and around the district which have long since passed their usefulness, and are now neither of value nor ornament. Retaining an old, decayed, and totally neglected fruit tree for shade has nothing to commend it, especially as there are so many trees more eminently suited to the purpose. Old trees with broken or decayed limbs are a harbor for pests, and a good spraying can easily be counteracted in this way, and, then, likely as not, the spray mixture is blamed when there is no appreciable diminution in the pest. The only value trees of this kind have is from the point of view of how much firewood they will yield. During the past season many fruit trees have died throughout the district as the result of the excessive moisture in the subsoil, following an exceptionally wet season. The trees probably reached the stage where the fruit had set and developed to a certain extent before they died. Had the tree been dug up, the roots would no doubt have revealed the trouble at once, wet and rotten, and if broken, emitting a distinct sour odour. This, of course, is a climatic condition which cannot be controlled,

but much can be done to minimise its effects by good drainage and keeping the soil in good heart. Trees that have died right out should be removed wholly and the preparatory work of replacing carried out. The ground requires deep and thorough working and an application of farmyard manure, and to be followed later by a dressing of lime would be an advantage. Replace a stone fruit tree with a pome fruit tree and *vice versa*. Trees only partly affected by the wet conditions also need attention. If a limb has died right down, remove it as close as possible to the junction of the stem and coat the exposed surfaces with thick paint. Where the limb is only partly affected the dead portion should be removed, care being taken to see that the limb is cut back to a good healthy shoot or bud growing out in the right direction. Young trees could be planted now. The advantage of autumn planting lies in the fact that the roots of the tree become established before the ground becomes too cold, and then, with the approach of spring and warmer conditions, they are ready to go right ahead. Only yearling trees, that is, trees one year old from the bud, should be purchased. The check incidental to transplanting is then only slight and they soon recover, whereas older trees with a larger root system receive a more severe check and consequently take longer to become established. The latter, too, are often the culls of previous years and sometimes difficult to train into well shaped trees. Purchase from a reliable source, for although the low-priced article is the cheapest at the outset it is more than likely to become the most expensive in the long run; therefore start off with good, healthy trees which can be reasonably relied upon to be true to name, and for which a reasonable price has been paid. The selection should be such that there is a succession of fresh ripe fruit and not all of one variety ripening at the same time; and always have two trees of the one species, but not necessarily of the same variety. The following varieties are recommended, the order of ripening being adhered to as much as possible:—Apples—Of the early ripening kinds, Gravenstein and Ribstone Pippin for dessert, and Twenty Ounce or Maiden's Blush, a cooker which grows to a large size. Early ripening apples do not keep well, so it is advisable not to plant to any extent. Jonathon is one of the best for the district; King David and Delicious are both well recommended. Cleopatra is one of the best all-round apples cultivated, but it is susceptible to disease in a district such as this. Dunn's, a very fine cooker or dessert apple, is likely to crack badly at the stalk under wet conditions. London Pippin or Five Crown does very well and is recommended in preference to the above two. Hoover (dessert) and Reinette du Canada (a large cooker or dessert) both do well in the locality. Rome Beauty is an excellent apple, but as produced here, generally lacks color and flavor. Rokewood is a very late dessert or kitchen apple and is a great keeper if handled carefully. There are others, such as Strawberry Pippin, ripening before Rome Beauty, and Nickajack, a little later, well worth planting if space permit. Pears.—Williams or 'Duchess' is the best, and then there are Gansel's Bergamot, Beurre Bosc, and Glou Morceau, all good dessert kinds, and with the exception of the first named, good keepers. Vicar of Wingfield and Winter Nelis are late keeping, and the very large cooking variety, Uvedale St. Germain, which will keep five or six months without any particular care. Apricots—Oullin's Early and Moorpark, the latter a mid-season variety suitable for all purposes. Peaches—Brigg's Red May, Triumph, Hales' Early, Early Crawford, Muir, Elberta, and Lady Palmerston. Nectarines—Gold Mine, New Boy, and Lee's Seedling. Plums—Early Orleans, Angelina Burdett, Diamond, Satsuma, Wickson, and Coe's Golden Drop. Quinces—Smyrna and Rae's Mammoth. The Fruit Fly—With the discovery of the dreaded fruit fly in various parts of Victoria it behoves all travellers, in the interests of the fruitgrowers of this State, to refrain from bringing fruit over the border in bags or suit cases. Too much publicity cannot be given to the discovery of the fly, for only in this way can its dangers be impressed upon the public generally; the fruitgrower is well aware of them. Legislation has been passed in Victoria which may seem drastic to some, but unless infested areas are isolated there is little chance of combating the pest. In that State fruit from a proclaimed fruit fly area can only be sent direct to a factory to be made into jam, after having having first passed inspection at the factory doors. The fly's methods of working is, briefly—The female fly carries an ovipositor by means of which it pierces the skin of the fruit and deposits eggs, seven or over in number. This puncture may not at first be discernible to the naked eye, which means that what

to all appearances is clean fruit might easily be infested with eggs of the fly. The larvae, or maggot, hatches out in a couple of days and feeds on the fruit for about a fortnight. The diseased fruit generally falls and the maggot comes out, burrows into the ground, turns into the chrysallis stage, and in about 14 days or so emerges as the perfect fly, again to carry on the destructive work. From the above brief description it can be realised what a difficult problem the fruit fly presents. Pruning and Spraying—Many landowners are neutralising the benefits derived from the closer observance of pruning rules by neglecting to spray the apple and pear trees with arsenate of lead to check and prevent codlin moth. Contrary to the generally accepted idea, codlin moth is easily kept in check if systematic and thorough spraying is carried out, even though the neighbor may be neglectful. At times objection is raised to the use of a poison, but to kill the grub a poison must be used, or how else is it to be done? South Australian regulations require the use of arsenate of lead for the purpose, and methods that might be adopted elsewhere do not apply here. It is estimated that at the Government orchard at Blackwood over 95 per cent. of the fruit is free of codlin this year. When it is remembered that this orchard has many hundreds of varieties flowering at different times, it can be realised how effective a good spraying is when applied at the right time. The first spraying should be given just as the petals are falling from the flowers when the lobes are closing, and subsequent sprayings should follow at intervals of 14 to 28 days. All rubbish must be kept away from the trees, and, as mentioned previously, get rid of all infested fruit. A source of frequent inquiry during the past season has been aphis on cherry trees. In most cases it attacked the young growing tips of the shoots, giving them a burnt or scorched appearance. The remedy for this and other aphides is to spray with kerosine emulsion or red oil and repeat the dose a couple of times with intervals of a few days. This is necessary, for only those directly touched by the mixture are killed. In one instance in one garden they were effectively dealt with by cutting off the affected part of the shoots and burning them. Another particularly troublesome pest locally is the so-called Soldier beetle. There seems little prospect of eradicating it, but much can be done to minimise the trouble by destroying all rubbish, weeds, &c., from the garden and not allowing them to accumulate. Hollow logs and hollow limbs should not be left about and the fruit tree with the hollow stem should be destroyed. Plenty of lime freely sprinkled about is very good. The season has been all in favor of fungoid diseases, and curl leaf of the peach has been well in evidence. Trees that were badly affected require within the next few months a good spraying with Bordeaux mixture or lime sulphur; the trees are then quite dormant and this early spraying is very necessary. Another application is needed in the early spring when color begins to show in the buds. The same treatment can be given the apricot to prevent shothole and scab." In answer to questions, Mr. Orchard said that when dealing with aphis on cherry trees, when in small numbers, he had met with splendid success with the use of kerosine brushed on the affected parts of the tree with an old tooth brush. Mr. A. J. Hemmings said in eradicating aphis from some fruit trees he had trenched the ground around the trees and placed soap suds and kerosine in the trench. He had found this effective. Mr. Orchard did not favor this course being adopted. He preferred that an application be made right to the pest.

KALANGADOO, April 8th.—Mr. McCorquindale read a paper, "Star Thistles," and in the discussion that followed it was agreed that the thistles should be destroyed so soon as they appeared on the farm. On Easter Monday a successful picnic, concert, and dance were held under the auspices of the Local Branch of the Bureau.

TANTANOOLA, April 5th.—The President (Mr. W. C. B. Haines) read an article, "Liming the Soil," and an instructive discussion followed. The Hon. Secretary (Mr. R. Campbell) tabled samples of vinegar made from waste apples.

TANTANOOLA, May 3rd.—The Hon. Secretary (Mr. R. Campbell) read a paper, "The Handy Man on the Farm," and gave a report of the proceedings of the South-Eastern Conference.

THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

No. 12. JULY 15, 1924. VOL. XXVII.

Published Monthly by the Department of Agriculture.

Edited by H. J. FINNIS.

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All communications to be addressed:
"The Editor, Journal of Agriculture, Victoria Square, Adelaide."

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T. BUTTERFIELD,
Minister of Agriculture.

POINTS FOR PRODUCERS.

Fruit Crop.

The harvesting of deciduous fruits is now completed, the last to be gathered being Doradillo grapes, which hung in fair distillery condition upon the leafless vines until mid-June. The crop of apples has probably been a record in quantity and quality also for a season of heavy crops and frequent summer showers. The overseas export has been larger than usual, and the trade with adjoining States greater than in any previous season. Added to this, the cool stores are well filled, and much loose fruit remains in private sheds and storerooms. Those in the latter are keeping the local prices down to a very low figure, owing to the necessity for marketing them before the losses from decay reach a high percentage. Citrus fruits are being marketed, navel oranges having developed an edible degree of sweetness, and lemons are ripening off rapidly. There appears to be an abundant crop of lemons of fair size and quality, but the demand is restricted. The orange crop is from fair to medium in quantity, and the size of a more desirable dimension than usual. This remark applies to navel varieties chiefly. Throughout all of the orange-growing areas, excepting where very closely sheltered by wind breaks, the orange trees are almost devoid of fruit on the south-western or western sides, a result, doubtless, of the cold, sleety storms experienced just about, and following closely upon, the setting of the fruit last spring. The producers of dried fruits, particularly of grape vine fruits, have had to handle a difficult problem this season, and the finishing up of the drying has been a long-drawn-out and exasperating experience. Many have resorted to extemporised kilns, heated by charcoal drums, while a few others have hastily erected evaporators of a more elaborate nature The samples of Sultanas and Muscats (lexias) produced have been surprisingly good, when the conditions have been fully considered, indicating what a fine crop of these fruits must have followed had the summer season been consistently warm to hot. The currant growers, though dealing with an earlier maturing fruit, had the misfortune to handle a crop in which the ripening and coloring was unusually inefficient, the result being a general sample of fruit well cleaned and fairly well dried, but poor in color and texture, and possessing little of the true flavor of the Zante currant.—Geo. Quinn, Horticultural Instructor.

Tobacco in South Australia.

The British-Australian Tobacco Company recently sent to South Australia an expert on tobacco curing, for the purpose of giving advice on the quality of the leaf grown in this State and the best methods of handling this. This expert (Mr. C. Lough), in company with the Director of Agriculture (Professor Arthur J. Perkins), and other Officers of the Department of Agriculture, inspected the tobacco grown and flue-cured by Mr. W. A. Gordon at Paris Creek, and by Mr. E A. Hunt at Mount Barker. After examining the leaf and the

soil conditions under which it was grown, Mr. Lough said the article was a very satisfactory one put up by beginners in tobacco culture. About 90 per cent. of the leaf inspected was suitable for manufacturing purposes. He further stated that the results suggested that with more experience in handling this crop it would probably be possible for growers in the districts mentioned to produce a tobacco leaf of really good quality. The determination of the best manuring practices was a matter that should receive consideration, and when these were arrived at, he thought that it might be possible for South Australian growers to produce an article of first-class quality.

Cereals at Veitch's Well.

The harvest returns secured at the Veitch's Well Experimental Farm for the season 1923-24 were considerably above the average. During the year the total rainfall was 13.33in., and of that quantity 11.75in. fell during the period April to November. The bulk of the area seeded was put in dry during April and May. Crops germinated well after the first rains on May 6th. Heavy winds in June and July cut the young plants with sand drift in some cases, and a dry October also had a depressing effect on yields. Of the area sown 71½ acres were cut for hay. This was sown with Cumberland, Baroota Wonder, Late Gluyas, and King's Early wheats, and yielded an average of 2 tons 1cwt. 105lbs. per acre. An area of 116.59 acres of oats was harvested for grain. The average yield was 18bush. 24lbs. The varieties which yielded above the average were:—Scotch Grey, 29bush. 24lbs.; Early Burt, 23bush. 39lbs.; Rua Kura, 22bush. 4lbs. The manager of the farm (Mr. L. Smith), in commenting on the oats grown, stated that of the varieties tried on the farm, Early Burt and Rua Kura were considered most suitable, because they could be harvested and cleaned up out of the way before the other cereals were ripe. Scotch Grey had proved a good and consistent grain yielder, but was rather short in the straw to be a good hay variety. Barley was sown on 78.47 acres of fallowed land, and yielded a return of 23bush. 38lbs. to the acre.

Of wheat, 24 varieties were grown, the average yield being 17bush. 24lbs. per acre from an area of 405¾ acres. The highest yielding varieties were:—Sultan, 25bush. 34lbs.; Walker's Wonder, 24bush. 29lbs.; Red Russian, 23bush. 15lbs.; Maharajah, 20bush. 25lbs.; Canaan, 20bush. 6lbs.; Triumph, 19bush. 1lb.; Queen Fan, 18bush. 28lbs.; Rajah, 17bush. 43lbs.; Gluyas Late, 17bush. 9lbs.; Cumberland, 16bush. 41lbs.; Gluyas Early, 15bush. 21lbs.; Caliph, 15bush. 1lb. These varieties and, in addition, Baroota Wonder, are, in the opinion of Mr. Smith, worth a place on any mallee farm.

In addition to the cropping referred to above, permanent experimental plots are conducted. These include—(1) Tests to determine the most satisfactory dressings of manure to apply to wheat crops; (2) tests to determine the most profitable methods of cultivating bare fallow for wheat growing; (3) relative value of different rates of seeding. Similar tests are also being conducted in respect to six-rowed barley.

The Agricultural Bureau.

During the year 1923-24, 17 new Branches of the Agricultural Bureau were formed in this State, at the following centres:—Wepowie, Kalangadoo (Women's), Cobdogla, Mannanarie, Light's Pass, Wookata, Bethel, McLaren Flat, Pinnaroo (Women's), Poochera, Tweedvale, Kringin, Charra, Brinkworth, Rudall, Gulnare, Karoonda. This brings the total number of Branches up to 233. The Agricultural Bureau was first established in 1888, and in that year there were five Branches, with a membership of 53. Twenty years later there were 113 Branches, with a membership of 2,000. Since that date the number of Branches has been more than doubled, and the number of members of the institution has been increased threefold.

Pruning and Orchard Competitions.

The pruning competitions which have been conducted by Branches of the Agricultural Bureau on the River Murray Settlements during the past four years have awakened a good deal of interest, not only in this State, but in other parts of the Commonwealth. The fame of the competitions has also spread to the United States, and from the State of California the Department of Agriculture some time ago received a request for particulars as to the method of conducting the competitions. A further communication has now been received from that State, acknowledging the receipt of particulars, and conveying information that the members of the staff of the University there are in hopes that similar competitions will be arranged. The Instructor in Pomology (Mr. W. P. Duruz) has written as follows relating to activities amongst fruitgrowers there:—

"At the present time we have some very interesting contests, known as peachgrowers' contests, in some of the peachgrowing districts; likewise in the prune districts, we have prunegrowers' contests. These contests are designed primarily to stimulate interest in better methods of growing and a higher quality of fruit. These contests have been going on for two and three years, and a great deal of valuable information has come out of them. The orchards are divided into classes, according to age and variety, and the fruitgrowers who are desirous of entering the various classes make out entry cards in the spring of the year, giving the location, acreage, variety, and age of trees, and as the summer goes on the fruitgrower keeps a record of the orchard as regards number of cultivations, number of irrigations, &c. At the end of the season, the fruit is sold to canneries or other commercial organisations, and the record of the crop as regards tonnage and quality is taken by the agricultural agent in the district. After the crop has been removed, the orchard is then judged on the basis of condition of the orchard and trees as regards health, vigor, fruit bud formation, &c. This is done by a representative of this department. Each orchard is scored on the basis of production, condition, and record kept by the fruitgrower. For full-bearing orchards, 80 per cent. is allowed for production, 15 per cent. for condition of trees, and 5 per cent. for record. For younger trees this scale is different,

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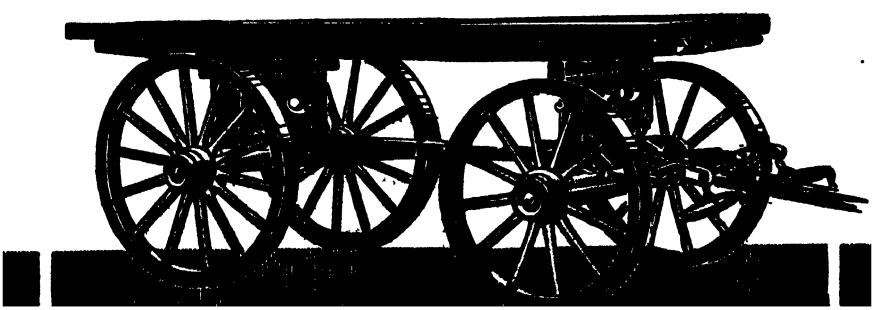
With the exception of the wheel rims, which are bent into shape when green, all the woodwork is thoroughly dried and seasoned before being used. When the wheel rims are bent into shape, they too are thoroughly seasoned, and in this manner retain their shape.

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according to age. For one-year-old trees, emphasis is placed on the training and shaping of the trees, so 95 per cent. is given on condition of trees and orchard and 5 per cent. for record. As the trees get older, more weight is given to production and less to training. The results from these contests have been very interesting. The winning orchards have brought out many good points of interest, and these serve as examples of the best practices for a given district. The average of production for a district has been raised as a result of these contests, and the interest aroused by them has been a great stimulus to fruit-growers. We believe that these contests are more valuable than any other feature that has been introduced into horticulture in recent years."

Cereals on Eyre Peninsula.

Although the rainfall record at Minnipa, Central Eyre Peninsula, last year was only 11.79in., the Government Experimental Farm at that centre returned the very satisfactory average of 22bush. 4lbs. of wheat per acre. Of the total area cultivated for wheat, namely, 480.97 acres, 163.72 acres of fallow land yielded at the rate of 24.42bush. per acre, and 307.79 acres of stubble land yielded at the rate of 20bush. 51lbs. per acre. A small area of new land, slightly under 10 acres in extent, yielded at the rate of 15bush. 56lbs. per acre. Hay yields were equally satisfactory. A return of 2½ tons to the acre was secured from Cape oats, and a trifle over 1 ton to the acre from Algerian. Wheaten hay averaged 1½ tons to the acre. For grain, 18 varieties of oats were sown. The highest yielding varieties were Kherson (40bush. 36lbs. per acre); Stark's Hooimaker (40bush. 33lbs. per acre); Guyra (38bush. 6lbs. per acre). The average for the farm was 31bush. 27lbs. Three varieties of barley were grown on stubble land. They returned an average yield of 30bush. 28lbs per acre. A small area sown to rye yielded 11bush. 53lbs. per acre

Agricultural Bureau Conference at Willowie.

The annual conference of Upper Northern Branches of the Agricultural Bureau is to be held at Willowie on Wednesday, July 16th. Sessions will be held during the morning, afternoon, and evening. During the course of the conference the following papers will be read:—"Care and Adjustment of Farm Machinery," Mr. S. T. Davill (Morchard); "Best Method of Increasing Production," Mr. S. L. McCallum (Willowie); "Farm Tractors," Mr. R. T. Avery (Willowie); "Recreation for Farm Hands," Mr. F. Bull (Willowie); "The Barometer on the Farm," Rev. A. Trengrove (Morchard). Messrs. W. S. Kelly, C. J. Tuckwell, H. S. Taylor, George Jeffrey, and A. M. Dawkins (members of the Advisory Board of Agriculture) will attend and, in addition, the Director of Agriculture (Professor A. J. Perkins), the Superintendent of Experimental Work (Mr. W. J. Spafford), the Wool Instructor of the School of Mines (Mr. A. H. Codrington), and the Secretary Advisory Board of Agriculture (M. H. J. Finnis).

Viticulture.

In a report dealing with viticultural activities during the month of June, the Viticultural Instructor at the Roseworthy Agricultural College (Mr. D. G. Quinn) mentions that owing to the cool, wet summer the vintage this year was exceptionally late. Generally speaking, the grapes ripened fully a month later than usual, and the thin-skinned varieties suffered considerably from the rains which fell during the ripening period. Pruning was the chief operation now in progress in the vineyards of the State, and excellent pruning wood was to be seen on most of the vines. Because of the good early winter rains, winter ploughing this year would be performed under good working conditions.

The Poultry Industry.

"Throughout the State there is a noticeable improvement both in the methods of poultrykeepers and in the class of poultry on the farms, particularly so in reference to fowls," says the Poultry Expert (Mr. D. F. Laurie), in commenting on the poultry industry during the month of June, 1924. "In the suburban areas there is a great expansion, and commercial poultry plants are increasing in number, and existing plants are being enlarged. There is a very big demand for commercial stock, and established breeders anticipate a strenuous breeding season, which is now beginning. The trade in day-old chickens is assuming large proportions, and will increase yearly, to the great benefit of all concerned. From an inspection of numerous large commercial, as well as small stud breeders' flocks, it is gratifying to be able to report that there has been a steady improvement in type and useful characters, and that last season's young stock, now in full lay, appear better than those of any previous season. South Australian commercial poultry is highly esteemed, chiefly for its heavy egg production, and this improvement in type, &c., must add considerably to this prestige. The adoption of better methods is increasing the supply of first-quality eggs. The market has been satisfactory. For the month of June, 1924, the average price paid for ordinary farm eggs, based on eight published market reports, was 1s. 8d., compared with 1s. 9d. for the month of June, 1923. There is every indication, however, that for the remaining months of the year prices will be rather better than during the corresponding period last year. There is a good local demand for eggs of first quality, and for general production the interstate trade is both satisfactory and growing. It is probable that shipments will be again forwarded to England. Last season's results were eminently satisfactory.

CORRECTION.

[On page 1069 of the June issue, in the advertisement of the Phoenix Motor Company, Ltd., in place of an illustration of a Hupmobile car, that of another was inadvertently printed. We regret the error.—ED.]

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

[Replies supplied by MR. A. H. ROBIN, B.V.Sc., Stock and Brands Department.]

"M. J. C.," Cradock, has a saddle horse with leg swollen from knee to the fetlock. Horse is lame and has been in this condition for six weeks.

Reply—You have neglected to apply suitable treatment to the injured leg for so long now that it will take a good deal of time and trouble to get the animal sound again, and the tendons may now always be more or less weak. Firstly, the horse must be given absolute rest, so keep it shut up in a loose-box or small yard, so that it cannot walk about too much. Take a piece of cotton wool large enough to go completely round the leg from the fetlock to the knee. Soak it in the following lotion:—Tincture iodine, 1 part; glycerine, 6 parts. Apply it to the leg so as to cover the injured tendon. Keep it in place by a stout calico or linen bandage fairly tightly applied and evenly from the fetlock to just below the knee, starting to put it on from the fetlock and working upwards. Repeat this dressing daily until the pain and heat have disappeared out of the parts and the animal moves better. Then apply the following blister to the tendon:—Red iodide of mercury, 1 part; lard, 8 parts. Rub well in for 20 minutes and cover loosely with bandage. Keep animal tied up short all day to prevent it biting the leg. The following day wash off blister with warm soapy water, snip any unbroken blisters, and apply a dressing of vaseline or bland oil, and turn the animal out to grass for three to four weeks. It may be necessary to repeat the blister at the end of this time, and the animal should not be put to work again for a couple of months.

"M. T. G.," White's Flat, has three-year-old draught filly with skin rash and sores on several portions of the body.

Reply—The animal's blood is apparently out of order. Prepare the animal for physicing by giving bran mashes. Starve overnight and give the following physic ball in the morning following before giving the animal any feed:—Aloes, 6 drams; calomel, ½ dram, nux vomica, 1 dram. Feed only on bran mashes while the physic is working, and subsequently feed on sloppy feed, to which is added a handful of Epsom salts daily. Dissolve the salts in a little warm water and use this to damp the feed. Give 1oz. of Fowler's solution in the drinking water daily for 10 days. If itching of the skin is marked, daub the parts with a solution of soda bicarb., as necessary. The animal will require a fair spell.

Hon. Secretary, Hartley Agricultural Bureau, Bletchley, asks cure for pigs affected with worms, and cows with skin disease similar to mange.

Replies—Pigs affected with worms should be starved for several hours and given the following:—(*a*) Turpentine, 1 tablespoonful; raw linseed oil, 2ozs. to 4ozs., well mixed together; or (*b*) Areca nut., 2 drams to 3 drams, given in milk. Destroy worms found in droppings, and feed subsequently from well cleaned troughs and keep drinking water supply clean. (2) *Re* skin disease in cows. Most probably ringworm. A few applications of tinct. iodine daily to the spots will, in this case, effect a cure, or the following:—Beechwood creosote, 1 part; rape oil, 8 parts, applied in the same manner.

Hon. Secretary, Agricultural Bureau, Rendelsham, reports mare with scurf and small sores in the mane and around the eyes; also gelding with a cavity between the horn of the hoof and the "quick."

Replies—(1) Give the animal a good dose of physic (an aloes ball), and subsequently feed on sloppy feed with a handful of Epsom salts added night and morning, or give a liberal supply of green feed. Clean out all scurf from mane with hot water and soap, with a little cresol added. Use a scrubbing brush and clean up thoroughly. The area around the eyes should be similarly treated to clear off all scurf, &c., but do not use a scrubbing brush here; use a piece of rag. Dry thoroughly after cleaning up and rub in well each day a little yellow vaseline. (2) Open up the cavity as much as possible with a hoof searching knife, so as to allow free drainage of pus and also to permit of dressings getting on to the wound more satisfactorily. Scrub the foot up to clean it, then put it into a bucket of water to which is added some condys or lysol. Give the foot a good soaking daily in this way for half an hour at a time. Then wipe foot dry with a piece of clean rag, pour a little iodine tincture into the cavity and plug it up to keep out all dirt, and tie the foot up in a piece of sacking to keep it clean in between dressings. Repeat this treatment daily till all discharge stops. Then plug the cavity with Stockholm tar and a little tow, and put a leather pad under the shoe to cover it up.

"E. C. S.," Pinnaroo, has mare with swellings on the chest, the belly, and legs.

Reply—Prepare the mare with bran mashes and give the following physic ball:—Aloes, 6 drams; calomel, ½ dram; nux vomica, 1 dram. After the physic has worked off, feed on sloppy feed and put a handful of Epsom salts in daily, or give a liberal supply of green feed. Allow the mare to have light exercise. Give 1oz. of Fowler's solution daily in drinking water for 10 days, and a heaped tablespoonful of the following powder twice daily immediately after feeding:—Pulv. fern. sulph., ½lb.; powdered nux vomica, ¼lb.; powdered gentian root, ½lb. When the swelling subsides, feed liberally on good feed.

Hon. Secretary, Agricultural Bureau, Mannanarie, seeks information *re* losses of sheep through eating stinkwort.

Reply—From evidence obtained, not only in this State, but from other parts of the world as well in connection with stinkwort, the plant is most troublesome when in the flowering stage, the sheep eating the young succulent shoots. Conclusive evidence as to just what is the exact nature of the trouble arising therefrom is wanting, but from our experience it would often seem to be merely a digestive upset. This condition is likely to arise too, where through lack of other forage, sheep are forced, through hunger, to eat the older tougher growth. Sheep, as a rule, will not worry stinkwort if there is other good edible feed available, and several instances have been noted by this Department where losses from stinkwort have ceased when the sheep have been liberally hand fed, even though they have still remained in paddocks where the weed is growing. An early dose of Epsom salts given to affected sheep and drenching with black coffee might prove serviceable in many cases.

Hon. Secretary, Blackheath Agricultural Bureau, Rockleigh, asks best method of removing warts from cows' teats.

Reply—Any warts having necks capable of constriction can be readily removed by snipping them off at the base with a pair of sharp scissors, and the cut surface touched up with a little caustic pencil. If they are large, they are liable to bleed severely, and are more safely removed by ligaturing them around the base with a piece of silk or fine waxed thread. When the warts have a broad base and cannot be handled in the above way, they should be treated first by giving them a good soaking in a weak solution of washing soda. This will soften them, and drying of the parts subsequently with a piece of rag will wipe off all surface scales and leave the warts opened up properly to the action of caustic, which must then be applied. The most effective caustic is silver nitrate, which can be obtained in the form of a small pencil or stick. The warts should be touched up with this, care being taken that it is applied only to the warts and not the adjacent healthy skin. A safe application is salicylic acid, 1 part, collodian, 7 parts. The rubbing in of vinegar or olive oil is sometimes effective in removing warts.

Hon. Secretary, Agricultural Bureau, Yadnarie, reports horse with growth on the inside of the eye.

Reply—The horse is affected with epithelioma of the eye, commonly termed by stockmen as a "cancer" of the eye. The condition can only be remedied by a surgical operation.

"E. H. M.," Clare, has pony with injury to the eye. The eyeball is punctured, and a membrane, dark green in color, is protruding.

Reply—Unfortunately the condition of the pony's eye is one which calls for some first hand attention by a qualified veterinary surgeon, but if you carefully follow out the following instructions fairly satisfactory healing will probably result, though the eye will remain blind. Keep the pony in a darkened stall if possible, or else cover the damaged eye with a piece of clean calico tied around the head so as to exclude the light. Bathe the eye three or four times daily with a little boracic lotion to remove all matter. Each time this is done put a little of the following lotion into the eye itself with a small syringe so that it runs all over the eyeball:—Tincture sulphate, 2 drams; boracic acid, 1 dram; distilled water or rainwater, 1 pint. The lotion should be warmed to blood heat before injecting it into the eye.

"A. T. G.," Second Valley, has horse, free from lice, continually rubbing tail on posts and fences.

Reply—The trouble is worms. Starve the horse for 16 hours to 24 hours and dose with raw linseed oil, 1½ pints, turpentine, 2ozs. In addition, give enemas of warm salt water, which will help to remove small white worms from the back part of the bowel, which are the cause of the irritation.

"H. J. A.," Langhorne's Creek, reports cow that passes yellow stringy matter with the milk.

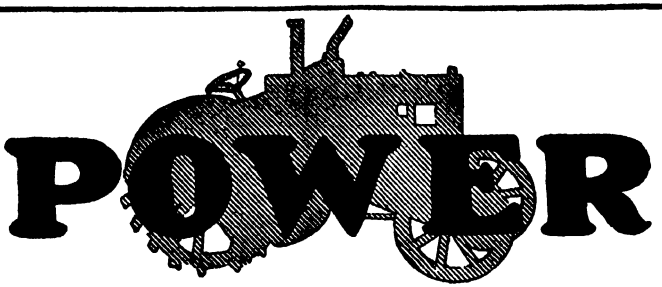
Reply—The cow has an attack of mammitis. Keep the udder and teats thoroughly clean. Strip out frequently—four or five times, or even more, a day if possible—making sure the hands are thoroughly clean. Destroy the milk, foment and massage the udder, and rub in a little camphorated oil. Keep the affected cow isolated from other animals, and milk her separately from the others.

"E. T. M.," Millicent, reports death of young pigs fed on new milk and later on milk from the separator; also heifer due to calve in six weeks. Calf appears to be in wrong position for birth.

Reply—(1) *Re* young pigs dying. The trouble would appear to be dietetic. The young pigs would be just at the age when they would be commencing to look around for food for themselves a bit, in addition to the milk supply they would be getting from the sow. It is quite a common thing for young pigs at this stage of growth to suffer from intestinal troubles and scour unless they are carefully handled. Particular care has to be taken with respect to the sty to see that it is thoroughly warm, clean, and dry, and that no spoiled food is left lying about. Any of the above conditions (particularly the last) is detrimental to young pigs. Young pigs are also better doers if allowed to get exercise by grazing. When young pigs are affected with intestinal troubles, it is safest and best to treat them per medium of the sow by giving her a good purgative and keeping her general health in the best possible order. Though not suffering apparently, a suckling sow will at times get somewhat dainty and off color, and this may seriously affect the young pigs through the milk. (2) *Re* heifer in calf. There is nothing you can do in this case, but nurse the heifer along until she is ready to calve, when any assistance, if necessary, to remove the calf can be given.

"E. E. M.," Curramulka, reports horses in poor condition, coughing, loss of appetite, and turns head to the rear when lying down.

Reply—The animals are suffering from chronic intestinal disorder, and two things in particular would seem to require serious attention, viz., the general management of the animals, and the quality of the feed. The description of symptoms point to there being something seriously wrong with the feed, which should be attended to otherwise trouble may continue. The stallion seems to have died as the result of a forage poisoning, and the mare seems to be going the same way. You may be able to save her by giving her a good cleaning drench of raw linseed oil, 1½ pints, turpentine, 2ozs., subsequently feeding on good quality food (easily digested) with a handful of Epsom salts in the feed night and morning for



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some days. Give some steamed oats, bran, good chaff damped, and a ration of green feed. The rig should be treated similarly. Let him get exercise by grazing, because exercise will be helpful to reduce the swollen legs. Make sure that horses have free access to a supply of wholesome drinking water.

BLACK SPOT IN WALNUTS

The Clarendon Branch of the Agricultural Bureau asked, "Will lime and soda, applied to roots of walnut trees, prevent development of black spot?"

The Horticultural Instructor (Mr. Geo. Quinn) says that this disease is caused by a bacterial attack, and no remedy is at present known. In the United States of America, where exhaustive researches have been made on the disease, a recommendation to select resistant sorts and propagate same has been advanced as the only solution of the trouble.

WHITE ANTS AND CEREALS.

"Why do white ants attack the roots of green wheat?" recently asked the Miltalie Branch of the Agricultural Bureau.

The Entomologist's Assistant (Mr. N. B. Tindale) of the South Australian Museum, reported in reply that there are a number of instances on record of termites attacking growing cereals. The damage is caused by species which normally attack grasses; these do not build conspicuous nests above ground, but live in colonies, in galleries on or near the surface of the ground. Very often the termites are secondary pests, following up injuries by other insects, such as cutworms or weevils, but in many instances healthy plants are attacked. The injury is most serious in recently cleared land, where there is abundant decaying wood and vegetable matter in which the insects breed. Such debris should be removed. In old cleared lands, ploughing in stubble provides a good supply of food for the pests, and should be discontinued where the termites are prevalent. If the infestation is serious, fallowing for a season, or deep ploughing, should be of value in checking it.

CABBAGE "BLIGHT."

Tarcowie Branch of the Agricultural Bureau asks for a remedy for "blight" on cabbages.

The Horticultural Instructor (Mr. Geo. Quinn) says if the "Blight" is cabbage aphis, spraying the leaves thoroughly on all sides with warm kerosine emulsion will suffice, if applied in the early stages of the attack. This kills by contact, and must be thrown on to the insects.

TOMATO WEEVIL.

Nelshaby Agricultural Bureau forwarded specimens of "a kind of bug or beetle that is very destructive to tomatoes this year," and asks for a method of treatment.

The specimens forwarded were identified by Mr. N. B. Tindale (Entomologist's Assistant, Adelaide Museum), as the Tomato Weevil (*Desiantha nociva*). This pest causes much damage in Victoria to tomatoes, cabbages, and other vegetables The greenish grubs are destructive, as well as the adult beetles. The nocturnal habits of these pests render them rather difficult to combat. Spraying all affected plants, and any other plants in the vicinity, with a weak solution of arsenate of lead should be of considerable help. In the case of seedling tomatoes, Mr. French recommends that sheets of paper be placed on the ground under the plants, which are visited at night—the light used startles the beetles, which can be collected from the papers on to which they fall. The beetles are very tenacious of life, and specimens obtained in this manner should be placed in boiling water for several minutes. They are very partial to the Marsh Mallow, and if any are growing in the vicinity they should be heavily treated with arsenate.

BURN STUBBLE BEFORE FALLOW.

"Would you advocate raking the stubble and burning before discing—keeping in mind the facts that (1) stubble may induce the spread of Take-all, and it is not usual to find Take-all in land carrying its second crop?"

These two inquiries were recently submitted by a farmer at Wynarka, who mentioned that owing to the unfavorable burning season, much of the stubble in the district remained unburnt. He proposes fallowing the land which has only carried one crop, and it was in special reference to this that he submitted the inquiries, which were replied to by the Superintendent of Experimental Work (Mr. W. J. Spafford) as follows:—"I certainly recommend burning stubble on the land you propose fallowing this year, because the fire has a disinfecting, sweetening, and mellowing effect on 'new' land, which cannot economically be given in any other way, and at the same time it is the cheapest known way of killing the scrub. Although it is not usual to have Take-all on land only carrying its second crop, after rolling down the scrub, there is more danger of this disease appearing if the stubble is worked into the land, than if it be burnt, because it is much easier to cultivate the soil properly after a fire than if the stubble is retained. I should say that from every point of view, it would be to your advantage to burn the stubble before fallowing."

PLANTS FOR IDENTIFICATION.

Specimens identified and reported on by Professor T. G. B. Osborn, M.Sc.:—

From Mannanarie Branch of Agricultural Bureau.—*Heliotropium asperrimum* (natural order, *Boraginaceæ*), a plant native to South Australia, and although there are no records that the plant is injurious to stock, it should be mentioned that some members of this genus are used medicinally, and, judging from the essential oil present in this specimen, the plant would probably produce scouring.

From Mount Barker Branch of the Agricultural Bureau.—*Panicum crus-galli*, an introduced grass of some fodder value.

From R. J. R., Laura.—*Oryzopsis miliacea*. The many-flowered millet grass, an introduced perennial. It is generally considered good fodder, and stands cutting, but, though widespread in South Australia, it does not maintain itself long except as a garden weed.

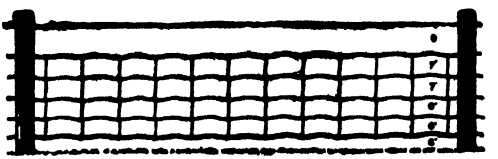
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TAKE-ALL INVESTIGATIONS, II.

[By GEOFFREY SAMUEL, Lecturer on Plant Pathology, University of Adelaide.]

When investigations on Take-all were commenced at the end of last year, a preliminary report was made* giving the conclusions drawn from inspecting a number of crops shortly before harvest, in conjunction with a consideration of the methods of cultivation used, as explained by the owners. In that report it was emphasized, as has frequently been done before, that proper methods of cultivation alone can do much towards controlling Take-all. The following practices all seemed to help considerably in lessening loss from this disease:—Burning the stubble after a Take-all diseased crop; fallowing early; keeping the fallow clean from all grasses, but working it wet, if possible, not dry; sowing wheat only on a good fallow; using heavier dressings of superphosphate; sowing later, such as is done with early wheats; rotating the crops, making such rotation as wheat-oats-bare fallow, or some other. It may be added that the practice of so-called "summer-fallowing", in which the land to be fallowed is ploughed up in March or April, before seeding-time, and remains clean fallow all the following winter and summer, will probably be found of considerably greater benefit than ordinary fallowing (after seeding, late winter) in the control of Take-all. This cannot be done on all soils, of course, but it is usually possible on the lighter soils on which Take-all is most prevalent.

During the summer months no experiments could be done with the disease on wheat plants under normal field conditions. Such experiments are now in progress, however, and it is to be hoped that some results will be available at the end of the year. In the meantime investigations have been continued in the laboratory into the parasitic fungi which are the cause of the Take-all disease, and the present report will outline some of the results obtained in this direction.

SANDHILLS BADLY AFFECTED.

As before, because of the courtesy of farmers of the district, of which special acknowledgment is made at the end, work was continued in the district of Pinnaroo, where Take-all is often severe in places. In this district there are flats of a reddish sandy loam crossed at intervals by long white sandhills, and it is on the latter especially that the Take-all

*Take-all Investigations, Journ. Dept. Agric., Sth. Aus., vol. 27, 438-442, Dec., 1923.

disease is usually found to be worst. It is not uncommon to see a good 20-bushel crop on the red flat part of the paddock, while on the top of a sandhill which crosses the paddock, sown in exactly the same way, nearly all the wheat may be diseased and stunted, and giving only five bushels or less to the acre. The disease is sometimes so bad on these sandhills that it cannot be said to occur in definite patches, as is supposed to be characteristic of Take-all; rather is wheat with good ears only in small patches. Take-all is frequently found even on the flats, but there it is nearly always present in more or less definite patches.

Take-all and "Foot-rots".

An examination of a large number of diseased plants collected from different paddocks, has shown that they were not all killed by the true Take-all fungus. In addition to this there were found fungi which have been described from other countries as causing "Foot-rot". Wheat plants were also found apparently killed by still other fungi, and these have been isolated and will be tested on growing wheat this season, to determine whether or not they are real parasites.

When the records of these examinations are considered in relation to the places in which the diseased plants were gathered, however, it becomes evident that although the true Take-all fungus is responsible for most of the damage in the patches on the heavier ground, this cannot be said of the damage on the sandhills. On the latter, "Foot-rots" of wheat seem to play an important part. The relative importance of Take-all and Foot-rots, however, can only be estimated after much more work has been done.

The examination of all the specimens collected is as yet by no means complete. Some indication of the relative occurrence of the different fungi can be gathered, however, from the figures so far obtained from the examination of a number of diseased wheat-plants taken at random from three different stubble-paddocks, separated by some miles from one another.

	A Flat.	B Sandhill.	C Sandhill.
Specimens examined	200	80	200
Specimens determinable	62%	24%	36%
Of latter—			
Fungus No. 1 (true Take-all, *Ophiobolus*)	67%	0%	27%
Fungus No. 2 (*Wojnowicia*)	33%	37%	9%
Fungus Nos. 3 and 4 (Foot-rots, *Helminthosporiums*)	0%	63%	64%

It will be seen from the above figures that the true Take-all fungus is the most important on the heavier land, whereas on the sandhills the Foot-rot fungi are more in evidence. It is probable that the

examination of a larger number of specimens may somewhat alter these percentages, but it is not likely to affect the general distribution noted above. (It is to be hoped that the figures can also be made more accurate by inducing spore-formation on many of the specimens on which the fungus was not fruiting, and which were thus unable to be determined with certainty.)

It should be emphasized here that these results are derived only from work done in the district of Pinnaroo. It cannot be said yet that Foot-rot fungi are common in other parts of the State. Indeed, from the results of a survey made some years ago by Prof. Osborn upon material sent in to the laboratory, it would seem that the true Take-all fungus is responsible for by far the greatest amount of damage. And if further work confirms the present supposition that Foot-rot may be the more important disease on the light sandhills, while Take-all is more important on the heavier land, then it is rather as would be expected that Take-all is the more widespread, for the majority of our wheat land is of the heavier non-sandy type. The present results make it highly desirable, however, that a more thorough examination be conducted over a wider area, and it is hoped that this will be done next season.

Control Methods.

With regard to the practical significance of the presence of Foot-rots as well as Take-all in our wheat, it can only be said that much further research must yet be done to find out the differences in the behaviour of these diseases, before we can make any differences in our methods of control. At present the same methods of control which are used for Take-all, as were enumerated in the first paragraph of this report, are found also to be good for the control of Foot-rots. It is of great importance, however, that in seeking more efficient methods of control for the diseases which affect our crops, we should first find out what these diseases are and how they act. It is only when we know these things thoroughly that we can make commonsense efforts at control, instead of groping about blindly in the dark.

How does Take-all Spread?

One point about which we need much furthur information is how the Take-all disease spreads. At present, if we have a good fallow, and get a good clean crop off it, we naturally assume that the land is free from Take-all. But it only needs a year or so's neglect by a careless farmer, and we can be practically certain that the Take-all will appear. How did it come there, is the question, and where did it come from?

On looking through the literature on the subject, very little of a definite nature is to be found concerning the spread of Take-all in nature. It has frequently been shown by pot experiments that pieces of Take-all diseased straw can convey the infection. The infection of wheat root-hairs under laboratory conditions by the spores of Take-all, which are formed at or near the surface of the ground on the bases of diseased plants, has also been described by one observer. Two descriptions can be traced of wheat plants having been infected by Take-all spores while the plants were growing in the soil. Only one of these is available in Adelaide, this being an account of some pot experiments by Mangin, in France. There, another fungus (*Leptosphaeria herpotrichoides*) is said to cause more damage by root-rotting and stem-blackening than the true Take-all fungus. In Mangin's pot experiments, in which spores of each of these fungi were sown with wheat, infection soon resulted in the case of the former, but no result was observed with the Take-all until a second lot of wheat was sown in the pots five months later, this second lot eventually becoming diseased. Infection by means of the spores thus requires further investigation yet.

Is Take-all carried on the Seed?

In this connection an article in the *Journal of Agriculture of Victoria* (vol. 19, 447; July, 1921), entitled "Seed-borne Diseases," should be mentioned. It was written after the Take-all disease of wheat had made its appearance in America in 1919. At that time, owing to her own huge exports to Europe because of the War, America imported over five million bushels of wheat from Australia. The Plant Pathologist of Victoria gave a warning of the risk that was being run; and none of the wheat was allowed to be used for seeding purposes. Very soon afterwards, however, Take-all was found in wheat fields in New York State, and rapidly spread. It seemed certain that it had somehow come from Australia with the wheat imported, becoming introduced to the land, perhaps, through some of the milling offal being fed to animals.

The question of the extent to which Take-all may be carried on the seed is important, however, and should be carefully considered.

It has been proved that the Take-all parasite only lives in the roots and few basal nodes and internodes of affected plants; tests made higher up the stems show that there is no fungus present in the top portion of such plants. The seed, in those cases where any seed is formed, must therefore be free from direct infection.

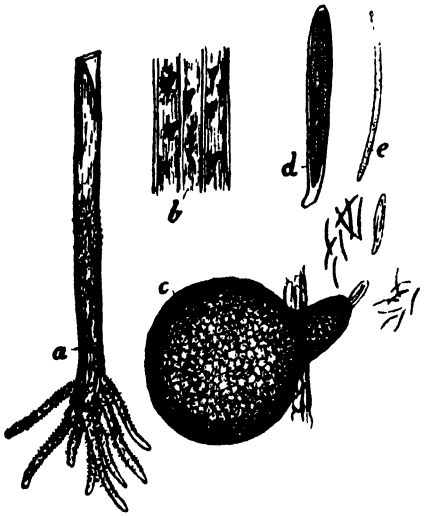


FIG. 1.

FUNGUS No. 1.

The true Take-all fungus, *Ophiobolus graminis—Ophiobolus cariceti.*

a. Base of affected wheat plant. The necks of the spore-cases can be seen as minute black dots protruding through the leaf-sheaths about ground level.

b. Appearance of protruding necks when magnified slightly.

c. Single spore-case more highly magnified, with neck protruding, ejecting packets of eight spores, which quickly burst.

d. Packet of eight spores, still more highly magnified.

e. Single Take-all spore.

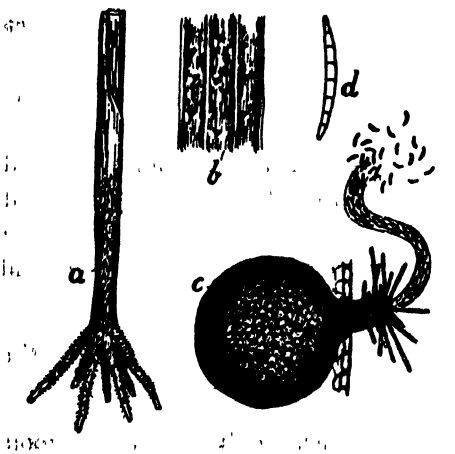


FIG. 2.

FUNGUS No. 2.

Wojnowicia graminis.

a. Base of affected wheat plant. The necks of the spore cases can be seen as minute black dots protruding through the leaf-sheafs about ground level.

b. Appearance of protruding necks when magnified slightly.

c. Single spore-case more highly magnified, with neck protruding and ejecting a tendril of spores embedded in mucilage. Spores soon flying apart in water.

d. Single spore still more highly magnified.

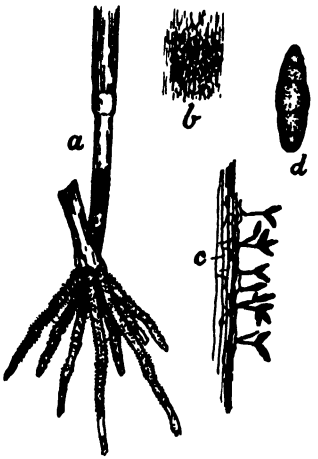


FIG. 3.

FUNGUS No. 3.

A Foot-rot fungus.

Helminthosporium sp.

a. Base of affected wheat plant. Spores formed in brownish layer on stem about ground level and below.

b. Spore layer slightly magnified.

c. Spore layer in section, more highly magnified, showing spores being formed on projecting branches of fungus.

d. Single spore, more highly magnified.

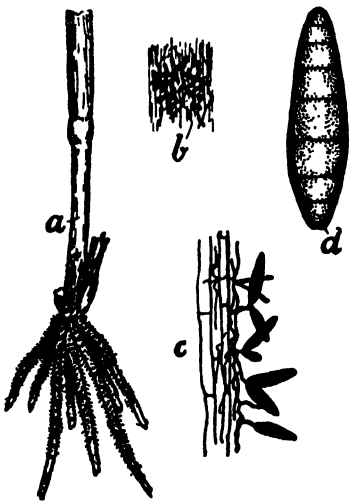


FIG. 4.

FUNGUS No. 4.

A Foot-rot fungus.

Helminthosporium sp.

a. Base of affected wheat plant. Spores formed on stem, mainly below ground (which is open and sandy).

b. Spore layer slightly magnified.

c. Spore layer in section, more highly magnified, showing spores being formed on projecting branches of the fungus.

d. Single spore, more highly magnified.

There remains the possibility, however, that very small pieces of diseased straw, or the spores of the fungus, might be blown up after the trampling of the harvester-horses over Take-all patches, and adhere to the beard of some of the grains. Even were this to happen very seldom indeed, it might yet be sufficient to introduce the disease to a new country. This is possibly what the author of the article on "Seed-borne Diseases" had in mind. It seems even more probable, however, that the infection might be carried on bags. In the case of both harvested, and stripped-and-winnowed wheat, bags are stood on the ground in the paddocks, and numerous pieces of straw stick to the bottoms. When it is remembered that a piece of diseased straw only the size of a pin's head, or less, can carry the disease, it can easily be understood how bags, having such fragments of diseased straw adhering, could carry the infection.

In a recent number of the *Journal of Agricultural Research* (vol. 25, 351, August, 1923), however, an American writer states that he has found the Take-all fungus on a native grass on ground which had been undisturbed for fifty years—the campus of Arkansas University, a thousand miles from the place of the outbreak in 1919. He concludes that "there is no reason for doubting the endemic nature of *Ophiobolus* on this native grass"; and therefore the outbreak in 1919 may not be traceable to infection from Australian wheat at all, and the Take-all fungus may have been present in America for many years, though previous to 1919, overlooked. (Or perhaps a more virulent strain was actually introduced.)

Method of Spore-liberation.

This brief review shows that much more information and careful experiment is needed yet before we fully understand how the Take-all disease spreads. The following notes on the method of spore-liberation of the fungi which cause Take-all and Foot-rots in this State, together with some field observations, have a bearing on the problem of spread; and though the observations are as yet very incomplete, a short account of some of them may be of interest.

The method of formation and liberation of the spores of these fungi may be considered best with the aid of the drawings given. Fungus No. 1, the true Take-all fungus, and to a lesser extent Fungus No. 2, are those usually found on the dead plants in Take-all patches on the (relatively) heavier land. Fungus No. 3 and Fungus No. 4, two Foot-rot fungi, are those which were found on many of the dead plants on white sandhills at Pinnaroo. The "spores" of the fungus, which may give rise to the disease when they come in contact with a growing wheat plant, in the case of Fungus No. 1 and Fungus No. 2, are

formed in minute black spherical spore-cases with short necks, each little case holding some thousand of spores. In both these fungi the spores are only ejected from the spore-cases, through the short necks, when the spore-cases are thoroughly wet with water. When thoroughly wet, water is absorbed and a mucilaginous substance swells up inside the spore-case to such an extent that the spores are forced out at the opening of the neck, at the rate of nearly 100 a minute for Fungus No. 1, and sometimes at the rate of 200 a minute for Fungus No. 2. The spores of Fungus No. 1 are ejected in little packets of eight, but in from five to ten seconds after the packet of eight emerges from the neck into the surrounding water, it suddenly bursts and the eight spores lie free in the water. The spores of Fungus No. 2 are pushed out first in a long tendril, being embedded in a mucilaginous substance; usually within a few seconds, however, the spores all fly apart from one another in the water, probably owing to the rapid absorption of the water by this mucilaginous substance in which they are embedded.

When once free in the water, of course, the spores of both these fungi can be carried about in the trickling rivulets formed during a heavy rain, or they can be splashed about by falling rain-drops. If they remain in water for from two to ten hours, even though it be only in a thin film on soil particles or roots, they will germinate, and send forth a thin germ-tube which will penetrate inside the roots of young wheat seedlings or grasses and start the Take-all disease. Many millions of spores, however, must germinate every year in places where there are no wheat plants to attack, such as is the case on clean fallow, and then they soon die from lack of food. One question which arises is, supposing that the spores become dry soon after they are pushed out of the spore-cases and before they have had time to germinate, can they be blown about in the air for considerable distances, and still germinate when they fall in water again? In connection with this, the following field experiments were made:—

Spore-traps.

"Spore-traps", consisting of glass plates smeared with a very thin layer of vaseline, were hung at several points along the fence on the windward side of a stubble paddock which had been badly affected with Take-all. Similar traps were also set on the windward side of definite Take-all patches at various places in the paddock. The traps were mostly set about 8 a.m. and collected and examined about 4 p.m., though others were left all night. An examination of diseased plants from the stubble showed that many spores, both of Fungus No. 1 and Fungus No. 2, had ripened in their spore-cases, and were ejected when the latter were placed in water. The spore-traps were first set on

13th April, there having been an appreciable shower of rain the previous night, and all the stubble being thoroughly wet. It is most probable, therefore, that many spores had been ejected during the rain. When the spore-traps were examined after eight hours' exposure, there having been a moderate wind all day, no Take-all spores were found upon them. The spores present in greatest abundance were those of the straw-blackening fungus (*Cladosporium herbarum*), which was everywhere on the rotting stubble. The following list gives an idea of the spores caught on a spore-trap (the glass plates being 3½in. by 7in. each) :—

Straw-blackening fungus	3,280
Various rust spores	44
Alternaria (mould)	5
Foot-rot of wheat	1
Take-all of wheat	0

Spore-traps were set on four consecutive days, and in the case of those on the windward side of Take-all patches, the experimenter tramped up and down on the stubble in front of the traps in order to try to raise some dust. Even on the fourth day after the rain, however, the ground was still moist, and little dust could be raised. On the twenty-two spore-traps examined no Take-all spores were caught.

This does not *prove,* however, that Take-all spores are not blown about. Under drier conditions it is possible that this might occur, and further tests will have to be made. In the meantime, however, certain laboratory tests have been made which have a bearing on the question.

In one series of experiments several hundred Take-all spores were liberated by crushing one or two spore cases into drops of water on a number of glass slides, and the slides set aside so that the water dried up leaving the spores air-dry. Each following day one such slide was tested by adding a drop of water and placing in the incubator, to see if the spores would still germinate. But it was found that on the third day after they became dry they would germinate no more. Under the cool, shaded conditions of the inside of a room, therefore, free spores lose their power of infection if dried for about two days. The experiment must be repeated under varying conditions, and with spores of different ages, before definite conclusions can be drawn, but it would certainly not seem from this that Take-all spores after they have been liberated would carry the disease long distances on dry seed for example.

In certain other fungi which eject their spores in packets of eight when the spore-cases are wetted, and in which the packet enclosing the eight bursts soon after ejection, the liberated spores are often shot

into the air and carried about by wind. Preliminary tests made on the Take-all fungus, by suspending glass slides round diseased plants on which spore-cases were present, which were then wetted so that they ejected their spores, gave no positive results of ejection of spores into the air. The tests made so far, therefore, do not favor any theory of the spread of Take-all over considerable distances by means of the free spores. Further tests are being carried out, however, which should yield more definite information soon.

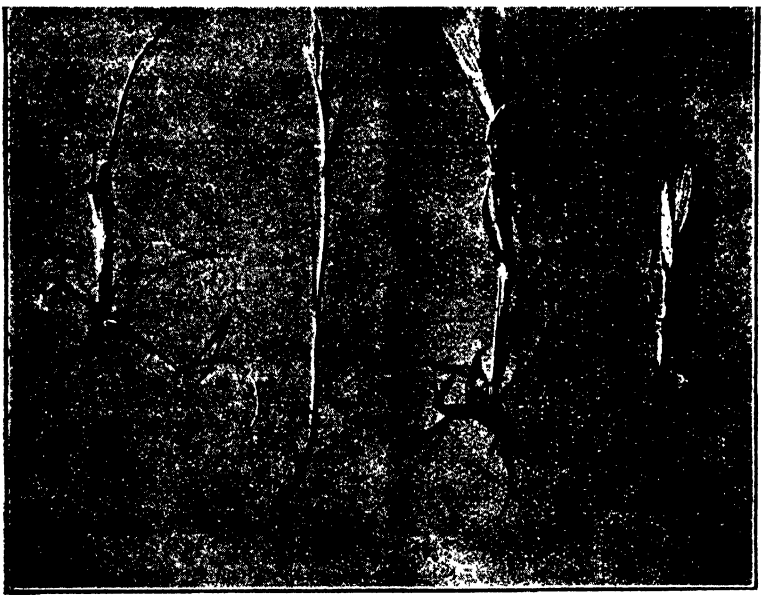


FIG. 5.—Barley-grass (*Hordeum murinum*) plants killed by the Take-all fungus (*Ophiobolus cariceti*). Note blackened stem bases and undeveloped heads. From pasture near Pinnaroo.

Spores of Foot-rot.

In the case of the Foot-rot fungi (Fungus No. 3 and Fungus No. 4, *Helminthosporium* spp.) the position is very different. The spores are not formed in closed spore-cases, as in the previous two fungi, but on minute branches of the fungus mycelium which project from the diseased straw in immense numbers near the level of the ground (see drawings). The spores are not readily blown off at first, but as they become dry their attachment becomes looser, and then a puff of wind may carry them away. Owing to their very minute size they are carried about in the slightest currents of air, and may travel thus for miles. They are also easily detached in water, and are no doubt washed off into the soil in great numbers during rain.

These spores also have a much thicker and harder wall than the Take-all spores; they live for a matter of weeks when dry, and could be blown long distances and still be capable of germinating in water. Only two of these Foot-rot spores were caught on the spore-traps exposed, but the tests were made only in a paddock where the disease was mainly Take-all, for at that time it was not known that Foot-rot occurred plentifully on the sandhills; a spore-trap, moreover, is very minute in size compared with a 60-acre paddock, and is only exposed for a few hours. Foot-rot spores have also been found to blow about in the air in America, and have been caught on spore-traps exposed from aeroplanes at a height of ten thousand feet. It should be mentioned that certain workers in America consider the main method of distri-

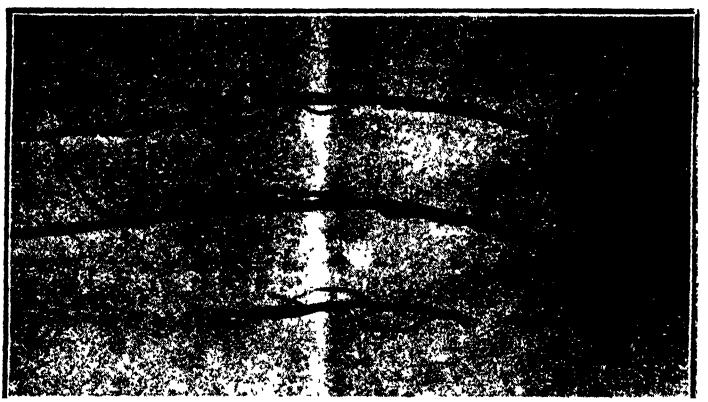


FIG. 6.—Take-all infected barley-grass stems found blowing about loose, two found on fallow. These stems carry the disease about in a viable form for several months.

bution of these Foot-rots to be the seed, at least in certain species; so far, however, this has not been confirmed for the South Australian disease.

Other Means of Spreading.

The blowing about of spores is not the only possible means of spread of these fungi, however. It was stated in the previous report that a considerable amount of Take-all infection of barley-grass, and to a less extent of silver-grass, was found on certain pasture-land. Take-all infected barley-grass is usually small and undeveloped, the heads often remaining enclosed in the sheaths (Fig. 5). The plants sometimes become almost fully developed, however, in which case they bleach off while healthy plants are still green, thus reminding one of

the "whitehead" stage of the disease on wheat. At the base of the stems is the same blackening visible on Take-all infected wheat stems.

On ripening and drying off in early summer these small barley-grass stems become very brittle, and are easily broken off from the roots by the footsteps of man or animals. Broken off stems were even found on pasture-land on which no stock had run since the time of drying of the grass. It may be, therefore, that wind alone can break off Take-all infected barley-grass stems. On the base of the broken off stem remains part of the Take-all infection which is still viable. The stems shown in Fig. 6 were picked up blowing about loose, and all of them showed Take-all to be present at the base when examined with the microscope. Two of them were picked up on fallow land, some distance from any barley-grass.

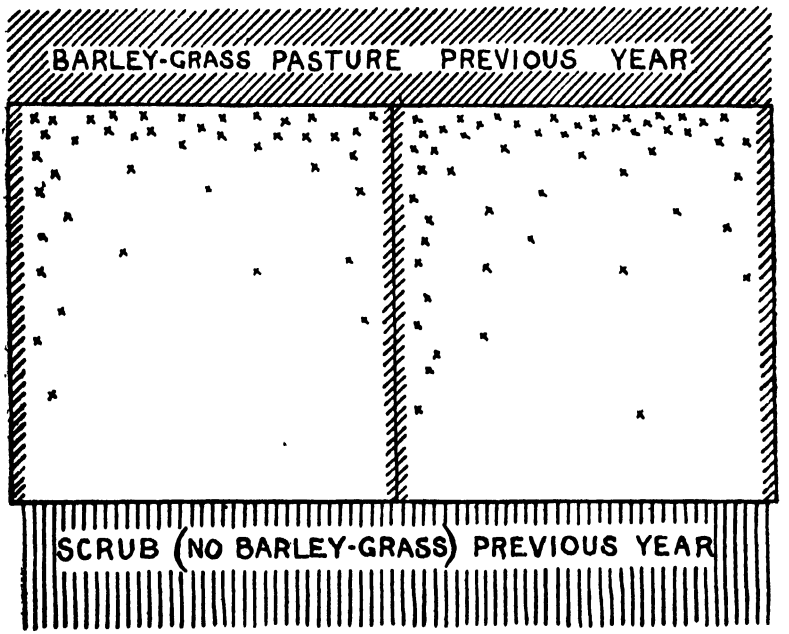


FIG. 7.—Diagram illustrating the manner in which two fields were affected with Take-all. The crosses indicate the distribution of Take-all patches, but are not accurate plottings.

If large pieces of Take-all infected barley-grass straw such as these can be blown over fallows, it will be easily understood how many more smaller, unnoticeable pieces might be blown about. The flimsy leaf-sheaths at the bases of infected plants are nearly always infected also, and very small fragments are able to carry the infection. It

would be very desirable to gain some more definite idea of the extent to which such fragments of straw are blown about, by the method of traps as used for spores. This was not done last year, but it is hoped that more information will be obtained this year.

Edges of Crops Suffer Most.

It is frequently remarked by farmers that the Take-all is worst round the edges of crops. This is what would be expected if infection were carried on to clean fallows by pieces of diseased straw blowing about. The diagram in Fig. 7 illustrates this point from field observations by the writer. Two adjacent paddocks both had good crops of wheat in them, except that along one side Take-all patches were especially numerous. As one advanced into the crop from this side isolated Take-all patches were still met with at first, but later the crop became perfectly clean, and no trace of Take-all could be found in the further half. No soil factors seemed to be sufficient to explain this, for the paddocks were very uniform. On inquiry it was found that during the previous year, when these paddocks had been fallow, a pasture containing much barley-grass had been on the first side, while natural scrub, which contains no barley-grass, was on the side which was clean. The infections were also noticeable a little way up the side fences, where there is nearly always a strip of ground left unploughed and supporting barley-grass.

Similar, but less striking instances were seen on other occasions. Although not proved yet that the barley-grass caused all the Take-all patches in these cases, it must be viewed with strong suspicion for the present. And in any case, because of its susceptibility to the Take-all disease, it is a grass which it might be well to endeavour to replace with something better. This grass was also found widely affected with Foot-rot. The spores from diseased plants are being tested on wheat to see if cross-infection results.

TECHNICAL NOTES ON THE FUNGI FIGURED.

MacAlpine, in his original description of *Hendersonia* (now *Wojnowicia*) *graminis*, on account of only finding it on specimens affected with *Ophiobolus graminis*, suggested that it might be the pycnidial stage of this fungus. In South Australia, specimens have been found with both the pycnidia of the *Wojnowicia* and the perithecia of *Ophiobolus* present, but in the large majority of cases the two do not occur together. The plate mycelium also appears to differ in the two; and the mycelium in culture is absolutely distinct. The mycelium of the *Wojnowicia* has characters in common with those described for *Leptosphaeria herpotrichoides* in France, especially the very characteristic lateral protuberances. In the degree of hairiness of the pycnidia there is also great resemblance to the condition as described for *Leptosphaeria*, all gradations existing from smooth, through bristles only on the neck, to wholly bristly. A more detailed account and discussion of these observations will be published later.

The Helminthosporiums have been sent away for authoritative naming; they also are being grown in culture, and will be described in more detail later.

SUMMARY.

It is shown that Foot-rots of wheat as well as Take-all occur in South Australia.

In the Pinnaroo area, where the observations were made, the Foot-rots occurred mostly on the sandhills, while Take-all occurred on the flatter, relatively heavier, soils.

Preliminary investigations point to the fact that Take-all is not distributed over long distances by means of its spores. On the other hand, infected pieces of straw, especially of barley-grass straw, have been found blown about in the paddocks, and these may be the main sources of infection.

It is a pleasure to acknowledge the willing assistance of farmers of the Pinnaroo district in rendering all kinds of facilities to the investigator, and especially of Messrs. W. B. Davis & Sons, on whose farm he several times stayed.

CHARLES WHITING,
GRAIN AND PRODUCE SALESMAN.

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Two a Month

That is the rate at which new Branches of the Agricultural Bureau are being formed in South Australia at the present time. Is there a Branch

In Your District?

If so, see that you are a member; if not, send a postcard to the SECRETARY, ADVISORY BOARD OF AGRICULTURE, VICTORIA SQUARE, ADELAIDE, for information as to how to start a Branch.

SOME ASPECTS OF THE PIG INDUSTRY.

[By H. J. Apps, Assistant Dairy Expert.]

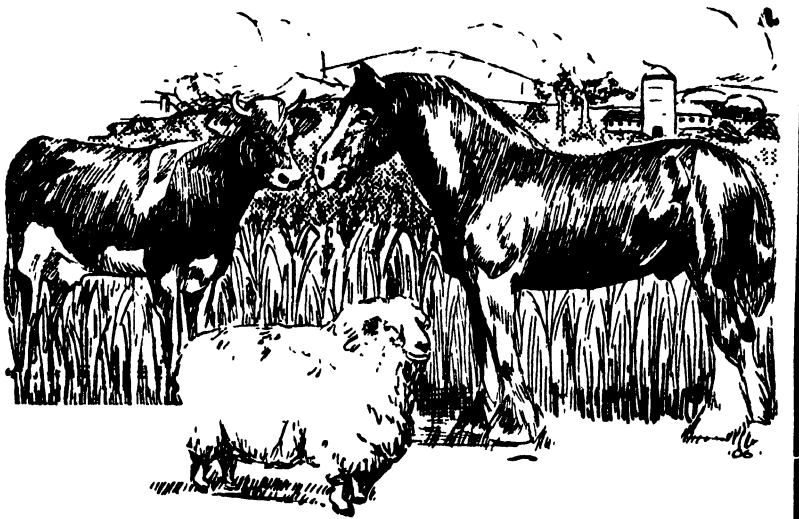
The pig industry in South Australia has not progressed as it should; in fact, in many quarters, its possible retrogression is viewed with alarm. The local Bacon Curers' Association have deemed the subject of such importance that they desire legislation to control the industry. They contend that the general standard of the pig has deteriorated, and the methods of feeding are not on sufficiently well-defined lines. Slaughtered animals very often betray the lack of proper feeding, which is not, in every instance, discovered by a cursory external examination, or by judging the animals by their handling qualities.

Briefly, the Association desire that every pig breeder or raiser should be licensed, and that all pigs which are submitted for sale should be branded with an approved brand. This would enable the curers to tell the animals yarded by the respective breeders and raisers, and consequently place them in a better position to gauge the quality of the product. The opinion that pigs which show signs of good killing qualities will always command the highest values is often misleading, by reason of the fact that very often such animals have not been finished off properly, and this condition cannot be definitely arrived at until after killing and curing. Many curers have experienced the condition of "soft" sides. A poorly finished and improperly fed pig will never produce the finest quality bacon.

There is no gainsaying the fact that in many respects local curers have cause to complain regarding the general type of bacon pig supplied to the market. Some of our breeders excel in producing a splendid type of finished pig, but it is a most difficult matter to impress on breeders and raisers the essential requirements of the trade. The majority of farmers are not concerned about the pigs when once they are sold. But it would be of mutual benefit to the bacon-curer and the pigbreeder if the latter would periodically visit the bacon factories and see the pig after it has been dressed; both will then be in a position to make comparisons. Curers welcome such visitors. Unfortunately, however, very few breeders avail themselves of this opportunity

Prize for Pen of Pigs.

The writer, realising the above facts, and the necessity for being able to impress definitely on breeders' minds the essential points of the class of pig required for the local trade, last year made a suggestion to the Bacon Curers' Association, that they should offer a substantial prize at the Royal Agricultural Society's Show for the best pen of four bacon pigs suitable for the local trade. The proposal is that the pigs are to be judged by the Show judge, and then one pen, other than the three selected as prizewinners by the Society's judge, will be chosen by representatives of the Bacon Curers' Association. These four pens of pigs will remain on the ground for two days of the Show to enable those interested in stockbreeding to view them. The pigs are then to be removed, slaughtered, dressed, exhibited, and judged by



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THE GREAT SOIL ENRICHING CROP.

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representatives of the Bacon Curers' Association, and the prize awarded according to their selection. To each carcass a card will be affixed setting out the age, the breed, and the live and dressed weights; further, each exhibitor will be asked to supply details of the system of feed and the class of food that has been given from the time of weaning up to the date of exhibition. It is also suggested that a prize be offered for the best essay on "Raising the Pig," the winner's paper to be published in the *Journal of Agriculture*. I contend that this scheme will be of great educational benefit, not only to men in the pig industry, but to livestock men generally.

An Export Market.

The opinion held by some that an export market is not required can hardly be accepted, in view of statistics of the export revenue of the Commonwealth. As regards the English market, it will be observed in the "Commonwealth Year Book" that in 1921 Australia did not derive any revenue from pig products. Professor Arthur J. Perkins (Director of Agriculture) has persistently advocated opening up an export business, but, unfortunately, his efforts have not met with much success. There is no denying the fact that Australia is missing an opportunity of getting a footing on the English market, and the longer the matter is deferred, the harder it will become to establish our product. Many persons argue in the strain that the price on the English market is less than that which obtains locally. This is admitted; but the most important facts concerning the position are either ignored entirely or not taken into consideration sufficiently. Even if prices on the overseas market are somewhat lower than local values, it would be a step in the right direction to export a small trial shipment. This would open up a channel whereby more wealth could be returned to this country, and it would have a decided influence in establishing the industry with a greater degree of security; and, further, it would assure a market for the product of the breeder and curer. It should be borne in mind that Denmark, prior to the war, was exporting to England 40,000 pigs per week in the form of bacon. Even in the year 1922 we find that the Danish Government subsidised the bacon industry in order that some incentive might be given to exporters of pig products.

Pigs, Cereals, and Potatoes.

One frequently hears a reference made to the small number of pigs per 1,000 head of population in the Commonwealth. It might be asked, "Can encouragement be given to stimulate greater activity in the industry, without creating an over-supply of pigs, which would have, as an ultimate result, low prices?" There is, however, one aspect of the pig industry which must not be overlooked, and that is the utilisation of cereals to better advantage. Wheat farmers of to-day are quite reconciled to trade their product in its original form; but what would be the position if the wheat market should drop considerably? Certainly any great quantity of wheat could not be profitably fed to the pigs, because if this plan were put into general practice, the increased production in animals would soon glut the markets.

Have Eggs at Your Own Price.



If you "keep a few fowls" the price of eggs is largely what you make it. If you are forced to go and pay the current price at the Corner Grocery simply because your own birds are not doing their duty, then it is obvious that you are paying two ways for your eggs.

That condition need not go on. Over half a million other poultry keepers have found the way to bigger egg returns. You too can do it.

Read these letters below and resolve that you will start using Karswood Poultry Spice to-morrow.

FROM A PROMINENT FANCIER.

Model Poultry Yards, Merewether,
Via Newcastle, August, 1922.

Dear Sirs—This is to certify that I have used your Karswood Poultry Spice, and for getting birds into show condition and health I find nothing better; also to increase the egg yield.

I am an exhibitor in all the leading Shows in N.S.W., and can recommend Karswood Spice to all who wish to be amongst the winning cards; also to keep their flocks in the best of health and condition and to keep the egg boxes full.

You may use this as a guarantee of my faith in Karswood Spice, as I am one of the leading fanciers in N.S.W., and am known all over the world. So if this is of any use to you as a testimonial, I shall be pleased to see it amongst your advertisements.

(Signed) C. A. CLARKE.

249, Bathurst Street, Hobart,
Tasmania, February 1st, 1923.

Dear Sirs—I tried Karswood with the best results. As a tonic it holds a high place in my estimation. In this cold, wet climate last winter I tested it with two lots of White Leghorn pullets. One lot with Karswood, the other without. Karswood pen laid five weeks before the others, and are still laying.

The feeding and housing has been the same throughout.

(Signed) J. SMALES.

HUNDREDS OF EGGS.

28, Edward Street,
North Sydney, May 3rd, 1923.

Gentlemen—I should like to say that I have used your Poultry Spice for two years—ever since I started to keep fowls. I have never had more than eight White Leghorn fowls, and have had hundreds of eggs from them. Your Spice was recommended to me by a friend, who brings it to me from town, as Mr. Meadows, who supplies me with pollard and grain, does not keep it.

Wishing you every success.

(Signed) P. M. BAITLE.

Corrie Road, P.O., North Manly,
July 20th, 1923.

Dear Sirs—Your advertisement in the *Evening Sun* this week came to my notice. I have a small poultry farm, and am a very enthusiastic user of Karswood. My first trial of it was on a yard of second season hens. The result was they gave twice as many eggs in that season as they gave in their first season.

I find it brings the young table birds on very rapidly. At three months old on Karswood they are equal in size to five months old without Karswood. That means a smaller feed bill and quick returns.

I am overstocked with the empty 7lb. tins, and am wondering if you have any idea of collecting and buying the tins back again. It is rather a problem how to dispose of them, and they are too good to throw away.

I never have "Poultry" paper, but *non de plume* for it—"Game Chick."

(Signed) MISS M. SHORT.

MAKE THIS TEST—

Go to your local grocer. storekeeper, or produce dealer. Get a 1s. packet of Karswood Poultry Spice. Test it for a fortnight on half a dozen hens. Do not expect an immediate avalanche of eggs. Karswood works naturally, not suddenly. Within a fortnight or three weeks you will notice a decided improvement in the health, virility, and productiveness of the Karswood birds.

NOTE THE ECONOMY.

1s. packet supplies 20 hens 16 days.
2s. packet supplies 20 hens 32 days.
13s. tin (7lbs.) supplies 140 hens 32 days.
14lbs. tins, 25s. 28lbs. tins, 48s.

Makes 12 Hens Lay for ½d. a Day.

AGENTS FOR SOUTH AUSTRALIA—

S. C. EYLES & Co.,
CURRIE ST., ADELAIDE.

KARSWOOD POULTRY SPICE "Makes 12 hens lay for ½d. a day."

The frequent occurrence of the collapse of the potato market could be obviated to an extent by utilising them for pig feed. Potatoes, in combination with grain and dairy by-products, make an ideal and cheap ration.

In the event of entering upon an export trade, we would doubtless find it difficult, and perhaps disappointing, for a few years; but, nevertheless, with practical experience of demands and markets, we would be in a position to command a share of the trade. I feel confident that we can produce the finest bacon in the world, for we have the food and climatic conditions essential for such a purpose, and the systems of breeding and producing the right type of animal would readily be accepted by the producers.

Every exporting country highly prizes the revenue derived from export markets. When the German markets were closed to Danish exports in 1887, the Danes immediately transferred their business to England; but they soon realised that they did not supply the article which commanded the trade, and a subsequent investigation proved that a better class of bacon-pig was demanded. They set out to accomplish this end, and they have succeeded. It is well known to every pigbreeder that huge sums of money are received by the Danes yearly from the English markets.

Then, again, we find the Canadian Government, after learning that their product was losing favor, appointed a Commission in 1910 to visit England and the Continent to investigate the bacon and pig industries and make recommendations.

The values in 1921, of pig products from Denmark and Canada, exported to the English markets were £17,000,000 and £7,000,000 respectively.

Local Requirements.

However, one cannot with any degree of confidence recommend greater activity in breeding operations without the danger of bringing about an over-supply and low prices. Owing to the prolificacy of the pig, great increase in the number of breeders would cause an over-supply. Therefore, this article will deal with the question entirely from the point of view of local conditions. There are many phases of the industry which have been repeatedly quoted by various writers, and yet we have not secured that uniformity of style and finish which is so much sought after.

Size.

To-day there is a most noticeable lack of attention to the size, the conformation, and the quality of the animals. It must not be imagined that because a pig scales the desired weight, and is in prime condition, that it comes up to the standard of the curer Many animals are too short in the body, and they dress sides which do not possess uniform back fat and the requisite amount of fat in proportion to lean meat. The blocky or chubby animal is not appreciated any more than the one possessing mostly skin and bone; such a pig generally has good length and depth, but lacks thickness, or, in other words, does not carry sufficient flesh. This class of animal is the least profitable from the raiser's point of view, for, as a general rule, not a great amount of

the right class of food is needed to finish it off. The cost of extra grain that would have been consumed in topping off would be more than compensated for by the enhanced prices to be obtained for a "prime" conditioned animal.

Weight.

There is also a desire to over-estimate the value of weight. The day of the big pig is past. It is false economy to keep pigs until they are extra weighty, because with animals of this class considerably more feed is required to produce a pound of dressed weight. The large pig is invariably on the market during the warm weather, and is probably an autumn pig kept going through the winter months, during which period it does not make as much growth as animals born in the warmer months. Then, as spring approaches, there are more dairy by-products available, and with more favorable weather conditions and better feeding stuffs, the growth rapidly increases; very often the disadvantage of marketing a few animals at once causes the owner to postpone forwarding them for sale until at last he realises that they are weighty, or that the grain bin has to be frequently refilled. There is only a limited demand for heavy pigs, and as a general rule the selling price works out less per pound than that of the bacon type.

The Curers' Requirements.

The question naturally arises, how are we to know what is required, and what methods must be adopted to obtain the desired results? We are often reminded that the curers ask for a pig dressing 110lbs. to 120lbs., and then we are informed they desire heavier animals. From the point of view of the curer, a lighter animal fulfils the warm weather demands, but during the milder months a heavier side is needed and at the same time a percentage of the heavier class of pig is always required.

In answer to such queries, it might be pointed out that the "demonstration prize," as suggested earlier in this article, should readily show the class of pig required; but at the same time, such matters as the breeds of pigs, breeding, rearing, feeding, and treatment enter largely into the question.

Pig breeding generally follows where dairying is practised. Whilst it cannot be denied that milk-fed pigs (animals fed on other foods in conjunction with milk and its products) produce the finest-quality pork; yet pig-raising can be practised without the aid of dairy by-products. In the latter case, it means the selection of deep milking sows; a longer suckling period, and, after weaning, food that will promote growth and flesh. The experiments carried out by Professor Perkins with by-products from the Abattoirs conclusively proved that pigs can be raised successfully without dairy by-products. Where skim-milk, butter-milk, and whey are not available, it should be the principal aim of the breeder to endeavour not to breed too often, but rather to study the sow and the development of the young pigs.

Therefore, in the first place, it becomes necessary to give the qualifications of a good bacon pig, irrespective of the breed. These are as follows:—

*(1) *Head—Neat.*—The pig that is very long in the head is usually narrow between the eyes; has seldom a very strong constitution, and has rather more bone than is required. On the other hand, the pig that is very short in the head is usually too fat; too heavy in the fore end; thick in the neck, and heavy in the shoulders. Neat in the head means neither too long nor too short a nose. The ears should be fairly large, soft, and pliable, and should fall a little to the front without actually being lopped.

(2) *Light Neck and Shoulder.*—The coarser parts of a side of bacon, and those which bring the lowest price, are the neck and shoulder. The lighter these parts, the better the side, and the higher the price it will make.

(3) *Deep Heart and Well-sprung Ribs.*—These are the weak points of the majority of animals; but they are, perhaps, the most important of those here enumerated. For stock purposes, breeders should, therefore, select only those animals which have these characteristics in a prominent degree.

(4) *Thick Loins.*—A pig with a good loin is almost invariably well ribbed and has a strong constitution. From a breeder's and feeder's point of view, a good loin is most essential.

(5) *Stout Thighs.*—This means a pig thoroughly well developed in the hams. The hams are the most important part of the animal, and in the case of pigs killed for the ham and middle trade, are the most valuable part of the carcass, provided they are not too fat.

(6) *Short Legs.*—A pig that is long in the leg is nearly always flat in the ham and lacking in plumpness.

(7) *Long and Silky Hair.*—Good hair is an indication of strength of constitution, as well as lean meat. The absence of hair generally proceeds from close breeding, and indicates a tendency to excessive fatness.

(8) *A Long Side of Moderate Depth with Thick Flank.*

*Department of Agriculture, Ireland.

(To be continued.)

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EXPERIMENTAL FARM HARVEST REPORTS.

VEITCH'S WELL EXPERIMENTAL FARM.

[By L. SMITH, Manager.]

This farm is situated in the hundred of Allen, 158 miles from Adelaide, on the Loxton Railway. It consists of about 3,800 acres of land, the bulk of which is sandy, the remainder running to shallow light-loam soils overlying hard limestone rock—conditions similar to thousands of acres of surrounding country.

THE SEASON 1923.

The returns set out in the following tables show that the season was a good one, and yields were considerably above the average. The total rainfall was 13.33in. Of this 11.75in. could be regarded as rain useful to the growing crop. The bulk of the area seeded was put in dry during April and May, and germinated well after the first rains on the 6th of May, this being exceptionally late for the season to break in this district.

Heavy winds in June and July cut the young plants with sand drift and in many cases sandy areas did not recover from the ill effects. A dry October reduced the yields somewhat.

RAINFALL.

The distribution of the rainfall for the year, together with that for each year since 1917 is set out in the table below:—

Rainfall Distribution—Veitch's Well, 1909-1923.

	Means. 1909-1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	Means. 1909-1923.
	In.	In.	In.	In.	In.	In.	In.	In.	In.
January	0.34	0.45	0.07	0.20	0.10	1.61	0.48	0.04	0.38
February	0.89	2.60	0.23	5.49	—	0.97	0.09	0.03	1.10
March	1.44	0.78	0.49	0.36	0.33	1.24	—	—	0.98
April	0.28	0.24	1.00	0.26	0.33	0.06	0.89	—	0.33
May	1.34	1.15	1.31	1.88	1.45	2.19	3.06	1.75	1.57
June	1.71	1.01	1.08	0.37	1.29	0.78	1.21	2.95	1.49
July	1.16	1.14	1.39	0.29	0.79	0.91	0.91	2.81	1.17
August	1.38	1.91	2.36	0.53	2.19	1.28	0.70	1.59	1.44
September	1.94	2.01	0.22	0.76	3.10	1.54	1.10	1.97	1.75
October	0.79	2.38	0.98	0.45	3.66	0.45	0.73	0.65	1.04
November	1.07	1.72	0.07	0.62	0.95	1.03	0.09	0.03	0.87
December	0.73	1.21	—	2.03	1.31	0.30	1.02	1.51	0.88
Total	13.07	16.60	9.20	13.24	15.50	12.36	10.28	13.33	13.00
"Useful" rain (April-November)	9.67	11.56	8.41	5.16	13.76	8.24	8.69	11.75	9.66

The distribution of the "useful" rainfall is set out in the next table. The amount gauged is shown to be above the average. Good seeding and winter rains fell.

	1923.	Means. 1909-1923.
	In.	In.
Seeding rains (April-May)	1.75	1.90
Winter rains (June-July)	5.76	2.66
Spring rains (August-October)	4.21	4.23
Early summer rains (November)	0,03	0.87
Total "Useful" rainfall	11.75	9.66

Crops.

In the fields, cereals were the only crops grown.

In small blocks near the homestead, lucerne and Wimmera rye-grass gave good feed. Special attention is called to Wimmera rye-grass as being suitable for this district, both on sandhills and flats.

Hay Crops.—A block containing 71.54 acres in Field No. 2 was sown with Cumberland, Baroota Wonder, Late Gluyas, and King's Early wheats. From this area a total of 150 tons of hay was cut for an average yield of 2 tons 1cwt. 105lbs. per acre.

The following table sets out hay crops harvested at Veitch since 1910:—

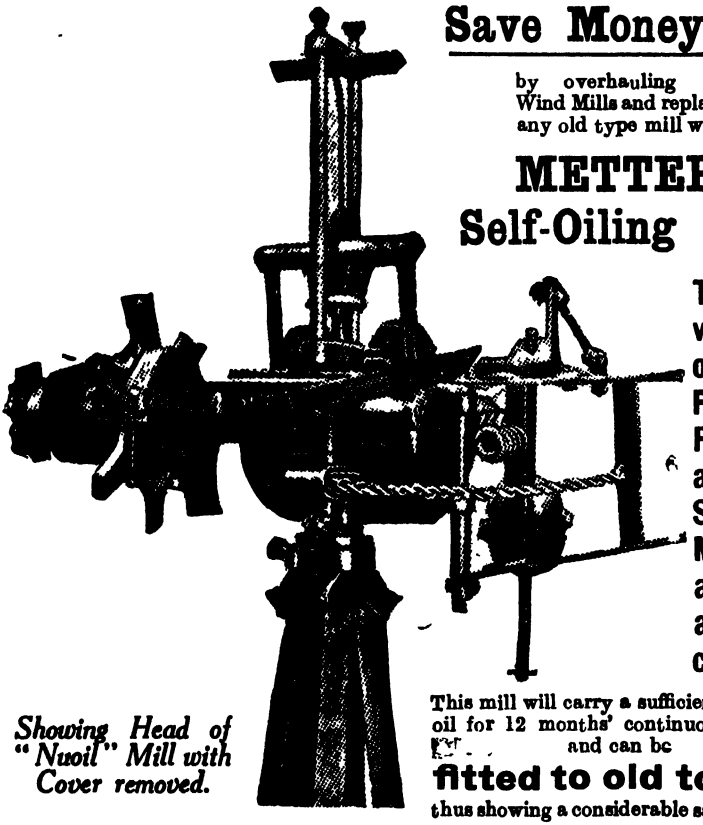
Hay Returns—Veitch's Well, 1910-1923.

Year.	Rainfall. Total	Rainfall. "Useful"	Area.	Total Yield.			Yield per Acre.		
	In.	In.	Acres.	T.	C.	L.	T.	C.	L.
1910	16.91	10.15	82.00	82	0	0	1	0	0
1911	13.36	7.28	121.50	74	18	0	0	12	37
1912	12.16	10.87	218.00	109	0	0	0	10	0
1913	14.95	8.27	140.00	70	0	0	0	10	0
1914	6.24	3.66	100.00	Total failure.					
1915	9.83	8.79	158.00	180	0	0	1	2	88
1916	16.69	15.29	127.08	243	0	0	1	18	27
1917	16.60	11.56	69.01	110	0	0	1	11	98
1918	9.20	8.41	78.89	93	16	0	1	3	87
1919	13.24	5.16	109.88	45	0	0	0	8	21
1920	15.50	13.76	122.21	220	0	0	1	16	0
1921	12.36	8.24	65.59	90	0	0	1	7	49
1922	10.28	8.69	42.94	60	0	0	1	7	106
1923	13.33	11.75	71.54	150	0	0	2	1	105
Means	12.90	9.42	—	—			1	2	20

The season's yield is above the average, and its inclusion in the mean for the farm brings that figure up to 1 ton 2cwts. 20lbs. per acre for the 14-year period 1910-1923.

Oat Crops.—All told 116.49 acres of oats were harvested for grain. These were sown in Fields Nos. 2A and 2B, being drilled in on fallow

Metters Double Geared Self-Oiling "Nuoil" Wind Mill



Showing Head of "Nuoil" Mill with Cover removed.

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METTERS Self-Oiling Mill.

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This mill will carry a sufficient supply of oil for 12 months' continuous working, and can be

fitted to old towers,

thus showing a considerable saving in cost.

Get in touch with us at once, advise us the pattern of your old mill, and give the height of the tower. We will be pleased to advise you how to make the best use of your old materials.

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between March 29th and April 23rd at the rate of 40lbs. of seed, with 1cwt. of superphosphate per acre. Fields No. 2A and 2B were fallowed June 1st to 29th, cultivated September 2nd to 21st, harrowed the first week in October and finally harrowed after seeding.

The results secured are set out below:—

Oat Variety Yields—Veitch's Well, 1923.

Variety.	Area. Acres.	Total Yield. B.	L.	Yield per Acre. B.	L.
Scotch Grey	16.83	498	6	29	24
Early Burt . ..	11.40	273	4	23	39
Rua Kura	13.3	294	0	22	4
Kelsall's	14.34	264	18	18	18
Algerian	29.88	468	32	15	28
Kherson	25.24	312	32	12	16
Lachlan	5.5	54	0	9	33
Farm average, 1923 ..	116.49	2,165	12	18	24

Of the oat varieties tried on this farm, Early Burt and Rua Kura are considered to be the most suitable, as they can be harvested and cleaned up out of the way before the other cereals are ripe. Scotch Grey has proved a good and consistent grain yielder, but is rather short in the straw to be a good "hay" variety.

The inclusion of this season's return in the mean oat yield of the farm increases it from 17bush. 25lbs. to 17bush. 30lbs. over a period of eight years. The yields for the past eight years are set out in the following table:—

Oat Returns—Veitch's Well, 1916-1923.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. Bush.	lbs.	Yield per Acre. Bush.	lbs.
1916	16.69	15.29	12.39	478	37	38	26
1917	16.60	11.56	50.19	1,396	35	27	33
1918	9.20	8.41	40.43	253	24	6	11
1919	13.24	5.16	39.17	379	12	9	27
1920	15.50	13.76	157.08	2,110	37	13	18
1921	12.36	8.24	36.30	623	30	17	7
1922	10.28	8.69	84.89	876	20	10	13
1923	13.33	11.75	116.49	2,165	12	18	24
Means ..	13.40	10.36	—	—		17	30

Barley Crops.—The barley crops harvested for grain were all grown on fallow over an area of 78.47 acres. The ground was fallowed on July 3rd to 31st and cultivated the last week in September, and

harrowed again in October, was seeded May 21st to 29th with 50lbs. of seed and 1cwt. of superphosphate per acre. The yields obtained, together with the farm average for the year are detailed in the following table:—

Barley Variety Yields—Veitch's Well, 1923.

Variety.	Area. Acres.	Total Yield. B.	L.	Yield per Acre. B.	L.
Tunis 4B (Exp. Plots) ..	28.18	758	38	26	46
Tunis 4B	40.46	890	40	22	1
Tunis I. (Seed Plots) ..	9.83	214	7	21	39
Farm average, 1923 ..	78.47	1,863	35	23	38

The next table shows the returns secured from the barley crops grown on this farm since 1915:—

Barley Returns—Veitch's Well, 1915-1923.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. Bush.	lbs.	Yield per Acre. Bush.	lbs.
1915	9.83	8.79	22.72	248	9	10	46
1916	16.69	15.29	20.10	517	20	25	37
1917	16.60	11.56	44.03	1,104	10	25	4
1918	9.20	8.41	49.68	305	5	6	7
1919	13.24	5.16	83.18	185	46	2	12
1920	15.50	13.76	73.20	2,232	48	30	25
1921	12.36	8.24	69.81	1,077	28	15	21
1922	10.28	8.69	72.24	947	38	13	6
1923	13.33	11.75	78.47	1,863	35	23	38
Means ..	13.00	10.18	—	—		16	50

The mean yield of 16bush. 50lbs. is not a high one for barley, but this is the best yielding cereal we have for bulk feed for pigs.

Wheat Crops.—With the exception of experimental plots all wheat crops were grown in Fields Nos. 1A, 1B, 3A, 3C, 3D, 10A, 10B, and 11A.

The fallow land in Fields Nos. 1A, 1B, 3A, 3C, 3D, was ploughed from July 20th to August 18th, and cultivated in September and seeded April 23rd to May 12th with 60lbs of seed and 1cwt. of superphosphate per acre. The bulk of Fields Nos. 10A, 10B, and 11A was new ground and was skim ploughed where it was found necessary before drilling—and seeded with 60lbs. of seed and 75lbs. of superphosphate per acre.

Out of an area of 190 acres in these three fields only 50 acres were harvested, as, unfortunately, a fire swept over the crops and destroyed a very promising yield

The yields obtained from all varieties grown are detailed in the next table:—

Wheat Variety Yields—Veitch's Well, 1923.

Variety.	Field Grown. No.	Area. Acres.	Total Yield. B.	L.	Yield per Acre. B.	L.
Sultan	1A	19.84	507	10	25	34
Walker's Wonder	3C & 3D	15.17	371	25	24	29
Red Russian	1A	16.55	386	25	23	15
Maharajah	3C & 3D	15.25	311	24	20	25
Canaan	—	5.99	120	24	20	6
Triumph	1A	27.82	529	11	19	1
Queen Fan	1A	16.23	299	40	18	28
Rajah	3C & 3D	6.94	123	0	17	43
Gluyas Late	3C & 3D	94.18	1,614	47	17	9
Cumberland	2B & 2C	1.75	29	12	16	41
Gluyas Early	3A	29.08	446	12	15	21
Caliph	10A & B	50.00	750	50	15	1
President	3C & 3D	9.18	137	0	14	55
Ford	3C & 3D	2.57	38	19	14	55
Mixed	3C & 3D	8.00	117	0	14	38
Felix	3C & 3D	12.20	177	0	14	30
Emperor	3C & 3D	8.99	109	7	12	8
Currawa	3C & 3D	4.42	53	21	12	4
Yandilla King	3C & 3D	3.10	34	22	11	5
Unknown	3C & 3D	3.08	33	22	10	48
Florence	3C & 3D	2.85	30	12	10	36
Fortune	3C & 3D	3.23	33	32	10	23
Le Huguenot	2C & E	4.16	40	52	9	49
Baroota Wonder (Sel. 1)	4A	13.72	87	50	6	24
Baroota Wonder	Exp.	28.18	626	40	22	14
Baroota Wonder	Exp.	3.27	52	41	16	7
Farm average, 1923		405.75	7,060	58	17	24

The yields recorded are above the average and the first twelve wheats and Baroota Wonder are worth a place on any mallee farm.

The next table gives details of the wheat crops grown on the farm since 1909:—

Wheat Returns—Veitch's Well, 1909-1923.

Year.	Total Rainfall. In.	"Useful" Rainfall. In.	Area. Acres.	Total Yield. Bush.	lbs.	Yield per Acre. Bush.	lbs.
1909	14.41	13.04	22.00	396	0	18	0
1910	16.91	10.15	197.50	2,156	0	10	55
1911	13.36	7.28	620.90	5,080	30	8	11
1912	12.16	10.87	569.00	5,544	18	9	45
1913	14.95	8.27	791.40	4,742	28	6	0
1914	6.24	3.66	951.00	325	30	0	21
1915	9.83	8.79	602.11	6,681	51	11	6
1916	16.69	15.29	407.74	7,102	20	17	25
1917	16.60	11.56	469.91	7,156	50	15	14
1918	9.20	8.41	287.89	1,905	28	6	37
1919	13.24	5.16	263.62	1,419	32	5	23
1920	15.50	13.76	287.52	6,384	55	22	12
1921	12.36	8.24	553.61	6,256	18	11	18
1922	10.28	8.69	427.84	4,219	34	9	52
1923	13.33	11.75	405.75	7,060	58	17	24
Means	13.00	9.66	—	—		11	19

Although the average yield of 11bush. 19lbs. per acre is not very high, it is quite satisfactory for these particular conditions With well-worked fallow land, clear of stumps, much better returns can be expected.

The behaviour of the majority of varieties of wheats grown on this farm since 1918 is shown in the table below:—

Yields of Varieties of Wheat—Veitch's Well, 1918-1923.

Variety.	1918. B. L.	1919. B. L.	1920. B. L.	1921. B. L.	1922. B. L.	1923. B. L.	Means, 1918-1923. B. L.
Red Russian	14 45	7 36	27 8	7 14	9 10	23 15	14 51
Queen Fan	2 54	4 36	26 18	13 14	14 5	18 28	13 16
Baroota Wonder	5 30	6 7	26 13	11 23	11 6	16 59	12 53
Yandilla King	10 35	3 18	25 10	11 37	11 8	11 5	12 9
Gluyas Early	9 53	6 44	19 19	14 56	4 34	15 21	11 48
Cumberland	8 29	5 10	18 47	10 11	10 16	16 41	11 36
Late Gluyas	3 40	2 13	19 43	11 43	12 57	17 9	11 14
Fortune	9 18	9 6	16 56	9 49	10 36	10 23	11 1
Federation	4 9	4 38	23 2	10 12	10 12	—	—
King's Early	5 9	4 34	17 25	7 59	8 0	—	—
Caliph	—	7 50	25 28	11 53	7 39	15 1	—
Triumph	—	—	14 22	13 25	14 0	19 1	—
Sultan	—	—	—	—	14 41	25 34	—
Walker's Wonder	—	—	—	—	15 4	24 29	—
Canaan	—	—	—	—	14 16	20 6	—
President	—	—	—	—	16 23	14 55	—
Rajah	—	—	—	—	12 58	17 43	—
Maharajah	—	—	—	—	9 5	20 25	—
Felix	—	—	—	—	10 11	14 30	—
Emperor	—	—	—	—	11 53	12 8	—
Ford	—	—	—	—	—	14 55	—
Currawa	—	—	—	—	—	12 4	—
Florence	—	—	—	—	—	10 36	—
Le Huguenot	—	—	—	—	—	9 49	—
Farm average	6 37	5 23	22 12	11 18	9 52	17 24	12 8
	In.	In.	In.	In.	In.	In.	In.
Total rainfall	9.20	13.24	15.50	12.36	10.28	13.33	12.32
"Useful" rainfall	8.41	5.16	13.76	8.24	8.69	11.75	9.34

Experimental Plots.

A series of permanent experimental plots, on which the various treatments to be given are to be continued for a number of years on the same blocks of land, has been mapped out. The series consists of manurial and cultivation tests with both wheat and barley.

Manurial Plots with Wheat.

The permanent manurial plots with wheat—being worked on the following rotation:—(1) Pasture, (2) bare fallow, (3) wheat—carried their fourth crops this season, with the following results:—

Permanent Manurial Plots with Wheat—Veitch's Well, 1920-1923.

Plot.	Manuring per Acre.
1	½cwt. superphosphate.
2	1cwt. superphosphate.
3	2cwts. superphosphate.
4	3cwts. superphosphate.
5	No manure.
6	1cwt. superphosphate, ½cwt. sulphate of potash.
7	1cwt. superphosphate, ½cwt. nitrate of soda.
8	1cwt. superphosphate, ½cwt. sulphate of potash, ½cwt. nitrate of soda.
9	No manure.

	Yield per Acre.								Means.	
	1920.		1921.		1922.		1923.		1920-1923.	
Plot.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.
1	28	43	15	47	12	15	21	53	19	40
2	28	19	17	53	13	6	25	40	21	15
3	32	29	19	9	12	49	28	14	23	10
4	31	37	19	18	12	4	26	35	22	24
5	24	59	14	33	13	13	18	24	17	47
6	28	18	19	47	13	14	20	50	20	32
7	26	59	17	47	12	50	23	14	20	13
8	29	53	18	30	12	11	22	19	20	43
9	21	18	15	49	13	26	16	51	16	51

Cultivation Tests with Wheat.

A series of experimental plots, worked on the following rotation:—(1) Pasture, (2) bare fallow, (3) wheat, and designed to test different methods of cultivating bare fallow for growing wheat, was commenced in 1920. The results secured from these plots are set out below:—

Cultivation Plots with Wheat—Veitch's Well, 1920-1923.

Plot.	Treatment.
	Early Fallow (June-July).
10	Ploughed 4in. deep and harrowed within a few days. (Cultivated whenever weeds or a crust rendered necessary.)
11	Ploughed 4in. deep, and left rough throughout the winter. (Cultivated whenever weeds or a crust rendered necessary.)
12	Ploughed 4in. deep, rolled within a few days, and cultivated or harrowed according to circumstances. (Cultivated or harrowed whenever weeds or a crust rendered necessary.)
	Late Fallow (September).
13	Ploughed 2in. deep, and cultivated whenever weeds or a crust rendered necessary, but not rolled.
14	Ploughed 4in. deep, heavily rolled the same day as ploughed, and immediately harrowed. (Cultivated whenever weeds or a crust rendered necessary.)

	Yield per Acre.								Means.	
	1920.		1921.		1922.		1923.		1920-1923.	
Plot.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.
10	27	5	17	28	12	57	22	10	19	55
11	28	19	17	8	13	31	21	48	20	12
12	27	33	13	45	12	44	21	35	18	47
13	24	19	14	17	12	51	23	28	18	44
14	26	33	13	16	12	28	18	41	17	45


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Manurial Plots with Six-rowed Barley—Veitch's Well, 1920-1923.

Plot.	Manuring per Acre.
28	½cwt. superphosphate.
27	1cwt. superphosphate.
26	2cwts. superphosphate.
25	3cwts. superphosphate.
24	No manure.
23	1cwt. superphosphate, ½cwt. sulphate of potash.
22	1cwt. superphosphate, ½cwt. nitrate of soda.
21	1cwt. superphosphate, ½cwt. sulphate of potash, ½cwt. nitrate of soda.
20	No manure.

	Yield per Acre.								Means.	
	1920.		1921.		1922.		1923.		1920-1923.	
Plot.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.
28	34	22	25	27	20	48	29	19	27	29
27	28	15	28	49	22	22	30	16	27	26
26	29	47	21	33	20	13	31	44	25	47
25	25	6	23	42	17	21	32	32	24	38
24	27	36	14	40	19	10	17	36	19	43
23	26	3	21	46	20	9	24	20	23	7
22	32	22	19	15	20	25	27	30	24	48
21	25	6	19	15	20	1	27	34	23	2
20	24	10	15	39	16	39	20	42	19	20

Cultivation Tests with Six-rowed Barley.

As in the case with the manurial plots, the cultivation tests on the (1) Pasture, (2) bare fallow, (3) wheat rotation, were duplicated as to treatment with six-rowed barley as the crop, instead of the wheat.

Plot.	Treatment.
	Early Fallow (June-July).
19	Ploughed 4in. deep, and harrowed within a few days. (Cultivated whenever weeds or a crust rendered necessary).
18	Ploughed 4in. deep, and left rough through the winter. (Cultivated whenever weeds or a crust rendered necessary).
17	Ploughed 4in. deep, rolled within a few days, and cultivated or harrowed according to circumstances. (Cultivated whenever weeds or a crust rendered necessary.
	Late Fallow (September).
16	Ploughed 2in. deep, and cultivated whenever weeds or a crust rendered necessary, but not rolled.
15	Ploughed 4in. deep, heavily rolled the same day as ploughed, and immediately harrowed. (Cultivated whenever weeds or a crust rendered necessary.)

	Yield per Acre.								Means.	
	1920.		1921.		1922.		1923.		1920-1923.	
Plot.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.
19	29	10	19	34	18	39	28	16	24	0
18	26	7	18	12	16	45	25	42	21	39
17	30	41	23	29	17	0	26	19	24	22
16	34	8	20	17	19	7	26	44	25	7
15	30	3	20	19	18	45	27	2	24	5

Rate of Seeding Tests with Wheat.

A block of land in a fallowed field has been selected during each of the past nine years, and has been divided into plots, all of which have received a dressing of 1cwt. superphosphate per acre, but each one had a different quantity of seed wheat sown on it. The same variety of wheat was used on all plots in each individual year, and other than the amount of seed used on the plots, their treatment was identical. The results obtained over this period, 1915 to 1923, are set out below:—

Quantitative Seed Tests—Veitch's Well, 1915-1923.
(*Tests on Wheat Sown with* 1cwt. *Superphosphate per Acre.*)

Year.	30lbs. Wheat.		45lbs. Wheat.		60lbs. Wheat.		80lbs. Wheat.		Total Rainfall.	"Useful" Rainfall.
	B.	L.	B.	L.	B.	L.	B.	L.	In.	In.
1915	9	47	10	9	10	45	9	57	9.83	8.79
1916	18	9	19	1	19	5	18	39	16.69	15.29
1917	22	53	23	42	23	56	26	31	16.60	11.56
1918	7	20	8	39	8	53	8	41	9.20	8.41
1919	7	21	7	20	7	51	8	34	13.24	5.16
1920	24	56	25	49	25	12	27	29	15.50	13.76
1921	17	13	19	31	19	16	18	31	12.36	8.24
1922	17	22	17	26	17	21	17	37	10.28	8.69
1923	17	35	17	22	15	18	14	17	13.33	11.75
Means ..	15	51	16	33	16	24	16	42	13.00	10.18

Although the differences between the results in the mean yields are not very marked, they are sufficient to show that in this district 30lbs. of seed is not sufficient for the best results, and that at least 45lbs. should be used.

Rate of Seeding Tests with Barley.

This season a block of "new" land, about 8 acres in extent, was divided into four plots, the whole of which was at seeding dressed with 1cwt. superphosphate per acre, but each plot received a different amount of seed barley (Tunis 1) to the acre. The yields obtained are set out below:—

Quantitative Seed Tests—Veitch's Well, 1922-1923.
(*Tests on Barley Sown with* 1cwt. *Superphosphate per Acre.*)

Year.	20lbs. Barley.		30lbs. Barley.		40lbs. Barley.		50lbs. Barley.		60lbs. Barley.		70lbs. Barley.	
	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.
1922	4	33	5	5	6	28	8	23	8	18	6	21
1923	21	48	25	26	20	33	24	8	—		—	
Means ..	13	16	15	16	13	31	16	16	—		—	

Fertiliser Tests with Wheat.

It will be some years before the results to be secured from the permanent manurial plots can be used as a basis of comparison, and as tests with various dressings of superphosphate on wheat crops have been conducted on fallow land, the yields obtained over the past nine years are tabulated as follows:—

Quantitative Fertiliser Tests—Veitch's Well, 1915-1923.

Year.	No Manure.		½cwt. Super.		1cwt. Super.		2cwts. Super.		3cwts. Super.	
	B.	L.	B.	L.	B.	L.	B.	L.	B.	L.
1915	11	52	13	15	13	43	13	40	13	19
1916	13	39	17	7	18	49	18	32	21	31
1917	20	47	23	48	25	30	21	17	25	15
1918	5	17	6	20	7	28	8	22	9	9
1919	9	15	9	28	9	43	10	37	8	58
1920	23	8	28	43	28	19	32	29	31	37
1921	15	11	15	47	17	53	19	9	19	18
1922	13	20	12	15	13	6	12	49	12	4
1923	18	24	21	53	25	40	28	14	26	35
Means	14	33	16	31	17	48	18	21	18	38

MILANG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MAY, 1924.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.		Butterfat.	
			Per Herd during May.	Per Cow during May.	Per Herd during May.	Per Cow during May.
			Lbs.	Lbs.	Lbs.	Lbs.
4/A	25·00	18·52	13,290	531·60	591·37	23·65
4/B	40·00	23·74	14,560	364·00	484·39	12·11
4/C	26·03	22·45	9,715	373·22	397·51	15·27
4/D	22·00	9·45	9,655	438·86	331·34	15·06
4/E	16·65	13·06	8,270·5	496·72	298·42	17·92
4/F	20·00	19·00	8,246	412·30	360·78	18·04
4/G	26·45	18·58	8,873·5	335·48	333·72	12·62
4/H	24·32	12·06	7,244·5	297·88	303·04	12·46
4/I	25·00	15·00	7,198	287·92	255·54	10·22
4/J	50·00	25·42	9,434·5	188·69	291·07	5·82
4/K	16·00	14·67	6,267	391·69	256·55	16·03
4/L	37·00	28·58	13,504	364·97	591·63	15·99
4/M	21·10	13·10	5,905·5	279·88	236·87	11·23
4/N	43·00	22·10	18,716	435·26	740·34	17·22
4/O	40·00	29·00	23,234·5	580·86	916·55	22·91
4/P	50·00	19·97	5,859	117·18	245·74	4·91
4/Q	35·00	31·00	13,407·5	383·07	518·96	14·83
4/R	15·00	6·00	3,28o	219·07	146·36	9·76
Means	29·59	18·99	10,370·36	350·51	405·57	13·71

MOUNT GAMBIER AND DISTRICT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MAY, 1924.

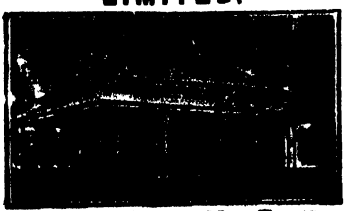
Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during May.	Per Cow during May.	Per Cow August to May.	Per Herd during May.	Per Cow during May.	Per Cow August to May.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
2/A	13·81	8·97	3,057	221·36	4,771·48	172·17	12·47	200·17
2/B	8·29	7·23	4,110·5	495·84	7,231·06	176·92	21·34	267·87
2/E	12	8·84	5,179	431·58	6,067·16	239·62	19·97	256·07
2/H	23·65	14·65	7,008·5	296·34	5,834·94	317·86	13·44	235·71
2/I	13·61	9·77	4,053	297·79	6,038·67	185·10	13·60	239·50
2/J	12	9·97	5,236·5	436·37	7,591·54	243·94	20·33	313·26
2/K	25	17·10	10,784·5	431·38	5,446 44	447·75	17·91	211·74
2/L	22	17	9,098·5	413·57	4,345·12	438·44	19·93	197·49
2/O	30	19·16	13,150	438·33	4,447·92	554·27	18·48	172·97
2/R	15	13·48	12,156·5	810·43	9,392·24	513·27	34·22	372·80
2/S	6	4	3,053·5	508·92	7,262·44	151·52	25·25	331·83
2/T	12	9·77	6,089	507·42	7,244·34	253·03	21·09	277·37
2/U	17	5·10	4,353	256·06	6,355·56	174·41	10·26	249·55
2/V	21	15	5,502·5	262·02	3,991·18	241·58	11·50	163·37
2/W	15·84	13·29	11,931	753·22	7,326·14	494·68	31·23	272·05
2/Y	11·94	7·90	5,146·5	431·03	6,937·08	227·95	19·09	281·88
2/BB	9	5·77	1,646	182·89	4,846·83	81·06	9·01	189·80
2/CC	13	8·32	2,555·5	196·57	4,231·38	116·78	8·98	183·14
Means	15·62	10·85	6,339·5	405·89	5,861·43	279·46	17·89	233·25

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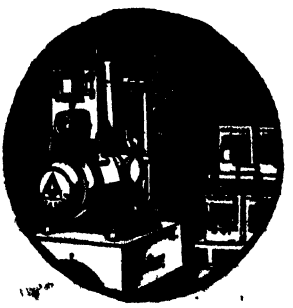
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GLENCOE HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MAY, 1924.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.		
			Per Herd during May.	Per Cow during May.	Per Cow October to May.	Per Herd during May.	Per Cow during May.	Per Cow October to May.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
3/A	17	14·13	7,264	427·29	5,984·12	353·93	20·82	253·76
3/B	16	12·29	2,840	177·50	2,897·27	127·12	7·95	127·16
3/C	12	7·29	4,109·5	342·46	5,016·56	182·43	15·20	202·98
3/D	10·55	9·35	5,880·5	557·39	4,646·01	220·20	20·87	178·59
3/E	14	12·23	8,281	591·50	4,867·59	402·47	28·75	210·25
3/F	9	7·26	2,213·5	245·94	4,468·36	102·91	11·44	184·97
3/G	13	10·48	4,995·5	384·27	5,140·62	211·72	16·29	195·47
3/H	16	9·32	2,929	183·06	4,019·61	133·55	8·35	157·65
3/I	15	12·55	5,340	356·00	4,462·13	245·72	16·38	188·79
3/J	17	14	4,724·5	277·91	3,138·33	224·59	13·21	143·73
3/K	22	20·39	9,580	435·45	4,416·90	422·82	19·22	187·51
3/L	24	10·19	6,510	271·25	3,750·65	272·17	11·34	154·22
3/M	14·42	9·68	3,166	219·55	3,684·09	136·64	9·48	159·05
3/N	17·19	13	6,032·5	350·93	4,074·47	288·77	16·80	176·45
3/O	17	14·42	4,004·5	235·56	3,759·89	183·45	10·79	142·65
*3/P	15	13·26	4,397	293·13	2,715·77	203·12	13·54	106·33
3/Q	55	42·06	13,605·5	247·37	3,903·13	647·04	11·76	162·47
3/R	18	15·03	8,985·5	499·19	5,088·41	407·68	22·65	221·13
Means	17·90	13·72	5,825·47	325·49	4,207·56	264·80	14·80	175·50

* Herd 3/P has only been under test for five months.



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PURE BRED COWS WHICH COMPLETED OFFICIAL TESTS DURING YEAR JULY 1ST, 1923, TO JUNE 30TH, 1924.

Herd Book No.	Name of Cow	Breed	Owner	Total Milk.	Total Butter-fat.	Age at Date of Calving.	Commonwealth Butterfat Standard.
				Lbs.	Lbs.	yrs. mths.	
8256	Belle of Eden Valley	Jersey	Cowan, F. G.	5,541	313·60	4 0	300
10033	Grand Bid of Eden Valley	"	"	5,299½	250·73	4 5	300
—	Isobel of Corinella	"	"	4,449	210·63	1 9	200
6619	Duchess 3rd of Dalebank	"	Cowan, L. T.	8,251½	418·91	6 0	350
6625	Lucy of Dalebank	"	"	7·501	389·11	5 0	350
4760	Melford's Majesty	"	"	6.835	372·04	7 2	350
6624	Lady Grey of Dalebank	"	"	6,772	355·31	5 4	350
4256	Clematis	"	"	6,305	349·22	8 10	350
5201	Twitter	"	"	7,167	326·75	7 9	350
8914	Buttercup 2nd of Dalebank	"	"	5·880½	320·35	4 1	300
6620	Firefly of Dalebank	"	"	6,219	308·25	4 10	325
8263	Lassie of Dalebank	"	"	6,109½	302 23	3 11	275
8340	Dido of Dalebank	"	"	5·715	300·02	4 1	300
8259	Viola of Dalebank	"	"	5,413	294 52	2 11	225
9223	Daisy 4th of Holmwood	"	"	6,190½	292·49	9 1	350
6628	*Rhoda of Dalebank	"	"	5,385	278,67	5 2	350
4255	Bramble	"	"	6,181½	273·66	10 4	350
10582	Rosette of Dalebank	"	"	4,998	272·44	1 11	200
10392	Fairy Queen 7th of Linden. Dunalister Mannakin's Perrees Capture	"	"	4,554 4,143	268·38 257·67	1 10 2 11	200 225
4252	Anemone	"	"	4,726	253 06	9 3	350
11317	Starlight of Dalebank	"	"	4,351½	253·03	1 11	200
10580	Melody of Dalebank	"	"	4,525½	243·31	1 11	200
8343	Duchess 5th of Glenelg	"	"	4,620	242·59	16 9	350
10395	Dunalister Mannakin's Perrees Primrose	"	"	3,408	203·05	2 11	225
8260	Jean of Dalebank	"	"	3,941	193·71	3 4	275
6669	Kate of Stonyfell	"	Crompton, R. and T. E.	8,596½	449·25	5 7	350
4436	Sweet Lotus	"	Eckermann, W. P.	8 578	438·61	7 10	350
8919	Jessica's Maid of Merliden	"	"	7,545	422·96	7 6	350
8375	Princess Lotus of Elm	"	"	6,113	408·36	3 9	275
10056	Lindora of Merliden	"	"	6 171	359·92	5 3	350
6763	Lassie Grey of Linden	"	"	6 805½	358·82	5 6	350
8371	Jean Kelly of Sunny Vale	"	"	5,954½	315·96	3 9	275
8374	Carmen of Pella	"	"	5,320	293·16	2 10	225
11396	Thora of Merliden	"	"	4,222½	264 44	1 4	200
10595	Princess Audrey of Pella	"	"	4,378	246·72	2 0	200
530	Woodcrest Duchess Pletje	Friesian	Hannaford, F. E.	20,703	688·15	5 11	350
754	Arrowville Ruby Paxton	"	"	8,532	297·13	3 11½	275
647	Domino's Holland Belle	"	Hawker, W.	14,560½	468·43	8 5½	350
165	Johanna Pontiac	"	"	11,268	412·28	4 11	325
Vol. v.	Longbeach Everlasting Daisy	"	"	9,304½	314·75	2 5½	200
8918	Rhodesia 3rd of Penrhyn	Jersey	Laughton, H.	7,800	397·00	9 11	350
11558	Rosebud 7th of Penrhyn	"	"	7,419	392·41	2 6½	225
8388	Christobel 4th of Penrhyn	"	"	6,075	343·36	6 4	350
11559	Lady Grey 9th of Penrhyn	"	"	6,447½	337·51	3 8	275
11547	Christobel 6th of Penrhyn	"	"	5,791½	327·70	3 10	275
11557	Rosebud 5th of Penrhyn	"	"	5,538	301·63	4 7	325
4233	†Christobel 3rd	"	"	5,780	295·67	9 6	350
8345	Kate 2nd of Stonyfell	"	Malthouse, J.	6,424½	376·46	3 7	275
6521	May 13th of Linden	"	Muirhead & Butler	6,096	355·39	4 7½	325
10728	Swallow 4th of Oakdale	M.S.	"	9,457½	354 20	5 11	350
6151	Beauty's Heiress of Wangara	"	"	8,086½	299·94	10 3	350
10597	Rhonda of Merliden	Jersey	McAuliffe Bros.	6,588½	346·98	3 5	250
10055	Eudora of Merliden	"	"	4,985	289·95	3 3	250
4386	Lobelia of Springhurst	"	Neumann, B. G.	7,014	403·67	8 11	350
7219	Doris of Klama	"	"	5,811	323·84	5 0	350
Vol XI.	Janet's Bright Lass of Grantala	"	"	5,431	264·34	1 11½	200
11656	Carnation of Oakhill	"	"	3,590	206·96	1 9	200
8417	Mayflower of Grantala	"	Pfitzner, J. A. J.	6,296	347·51	3 5	250
8416	Olive of Grantala	"	"	5,944	335·44	2 10	225
7817	Maggie of Grantala	"	"	5,299	302·59	5 8	350
8022	Jane of Koorali	"	"	4,944	278·94	2 8	225
7266	Noble's Guitar of Linden	"	"	4,029	235·80	4 10	325
4554	Violet 8th of King's Vale	"	"	4,827	229·30	8 4	350
9511	Thora 10th of Banyule	"	Symon, O. S.	7,047	413·53	3 5	250
4762	Queen of Sheba	"	"	6,768½	376·26	8 0	350
9510	Thora 9th of Banyule	"	"	6.745	331·46	3 1	250
10577	Ixia of Dalebank	"	"	4,557	281·49	2 11	225
10579	Mabel of Dalebank	"	"	5,188½	274·61	2 10	225
—	Rarity 14th of Melrose	"	"	4,780½	255·15	1 9	200
11475	Retford Promise	"	"	4,104	245·05	2 4	200
11478	†Retford Sybil	"	"	4,455	239·57	2 0	200
6937	Retford Vernonia	"	"	4,621½	225·82	5 3	350
10598	Jessamine of Merliden	"	Traeger, E. O.	3,894½	227·96	3 2	250
12080	Lobelia of Sunny Vale	"	"	3,480½	205·64	1 9	200

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, June 11th, there being present Mr. W. S. Kelly (Chairman), Capt. S. A. White (Vice-Chairman), Col. Rowell, Messrs. W. J. Colebatch, B.Sc., M.R.C.V.S., A. M. Dawkins, F. Coleman, J. W. Sandford, A. B. Feuerheerdt, L. Cowan, B.Sc. (Agric.), H. Wicks, G. Jeffrey, C. J. Tuckwell, and the Secretary (Mr. H. J. Finnis).

Apologies were received from Professor A. J. Perkins, the President of the Royal Agricultural & Horticultural Society, Messrs. A. Julius, P. H. Jones, and H. S. Taylor.

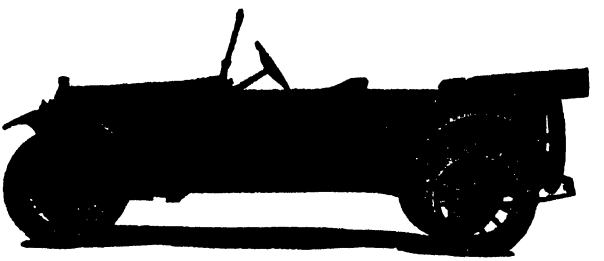
Alteration of Date of Michaelmas School Holidays.—The Chairman (Mr. W. S. Kelly) reported that he had interviewed the Director of Education in connection with the resolution carried at the last Congress—"That the Education Department be asked to alter the date of the Michaelmas holidays to synchronise with Show Week, so that country children might have the opportunity of attending the Show" —and that the Director had informed him that consideration was being given to the necessity for synchronising high school and college holidays with those of the country schools. It was pointed out by the Chairman that the Show was held during the high school holidays, and if the suggestion of the Director of Education were brought into force, the desires of the Board would be met.

Destruction of Foxes.—The Conference of Mid-Northern Branches resolved, "That the Advisory Board of Agriculture be asked to urge on the Government the necessity for bringing in legislation to provide for the simultaneous destruction of foxes on lines similar to those adopted in connection with the destruction of rabbits." The matter was referred to the Minister of Agriculture, who did not approve of the suggestion. On the motion of Mr. W. J. Colebatch, seconded by Mr. A. M. Dawkins, it was decided that the resolution should be brought before the Congress Committee for consideration at the 1924 Congress.

Afforestation on the River Murray.—At the March, 1924, meeting of the Board it was decided that the Irrigation Commission should be approached with reference to timber growing along the River Murray. A communication was received from that body, intimating that it would welcome suggestions from the Advisory Board relating to the conservation of timber on those areas. It was decided that Mr. Taylor should be asked to introduce the subject for further discussion at the next meeting of the Board.

Crop Competitions.—The Secretary reported that the Minister of Agriculture had approved of the determination of six (6) crop competition districts.

Utilisation of Waste Water at Tantanoola.—In connection with the suggestion of the Tantanoola Branch that an expert should be sent to the district to report on the feasibility of utilising the water running to waste in drains, the Secretary read a lengthy report on the matter from the Manager of the Kybybolite Farm (Mr. L. J. Cook). On the motion of Mr. W. J. Colebatch, seconded by Mr.



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A. B. Feuerheerdt, the Board decided to ask the Director of Agriculture for a report on the feasibility of establishing an experimental area in the Tantanoola district on the basis of Mr. Cook's report.

Distribution of Trees.—A communication was received from the Minister stating that after the present planting season, free distribution of trees would be discontinued, and a limited supply of pines and eucalypts would be raised for sale to the public at a price to be arranged later.

Washed Super Bags for Marketing Potatoes.—The South-Eastern Conference also resolved, "That it be permissible to use good, sound, thoroughly washed super bags for marketing potatoes." The Chairman of the Central Board of Health (Dr. W. Ramsay Smith) on being asked to express an opinion on the subject, said, "Regulation 10, Protection of Food from Contamination, paragraph 16 of the Food and Drugs Regulations, 1915, reads:—'No person shall enclose or carry or store wheat, oats, maize, potatoes, onions, fruit, or any other article of food for sale in any bag or sack or similar receptacle which has at any time contained, or has been used for the conveyance of bone dust or superphosphate, or any other manure or mixture of manures.'"

Planting Trees on Roadsides.—Correspondence on this subject was referred to Mr. Coleman, who undertook to deal with the question at the next meeting of the Board.

Tod River Water Scheme.—Smoky Bay Branch of the Agricultural Bureau sought information with respect to the Tod River Water Supply. The Board decided to forward their communication to the Public Works Department.

Stock Diseases Act.—At the Conference of Branches of the Agricultural Bureau on Kangaroo Island, held during June, it was resolved, "That the Stock Department take steps to enforce the provisions of the Stock Diseases Act on Kangaroo Island." It was decided to ask the Chief Inspector of Stock for a report on the subject.

Cable Advices on Barley.—The Kangaroo Island Conference also resolved, "That the Government be asked to secure from London, during the months of December, January and February, weekly cable advices of barley prices." It was decided to ask the Minister to instruct the Produce Department to obtain information from the Trade Commissioner in London on the lines set out in the resolution.

Red Wheats.—A communication was received from the Adelaide Corn & Produce Exchange relating to a proposed dockage on red wheats, and the Secretary was instructed to publish again in the *Journal* a list of red wheats, and the varieties of white wheats that could be substituted for the first named.

Coast Disease of Sheep on Kangaroo Island.—The Secretary of the Board, who attended the Conference of Branches of the Agricultural Bureau on Kangaroo Island, stated that very serious trouble was said to have been experienced on Kangaroo Island from what was generally known as "Coast Disease." On the motion of Mr. G. Jeffrey, seconded by Mr. J. W. Sandford, a committee consisting of Messrs. W. S. Kelly, W. J. Colebatch, and the Chief Inspector of Stock (Mr. C. A. Lloxton) was appointed to report to the Board on the question of the advisability of establishing a research institute for sheep diseases.

Life Membership.—The name of Mr. J. J. Deer was added to the list of life members.

New Members.—The following names were added to the rolls of existing Branches:—Glossop—A. Howse, A. H. Penney; Narrung—A. G. Thornley, W. C. F. Adcock, W. G. Morley, G. Hornabrook; Brinkworth—H. Snow, H. J. Allen, E. J. Heinrich, George Walladge, J. A. Ottens, H. E. Ottens, E. H. Ottens, A. H. Hoepner, A. O. Waldhuter, M. O. Lindblom, H. N. Cornish, A. N. Grigg, F. J. Pedler, J. P. Jarman, J. Stott; Streaky Bay—C. Thom; Rudall—C. E. Thompson, C. M. Smith, H. R. Roberts; Tatiara—F. Scown; Pinnaroo—A. T. Hawthorn, H. Tiller, F. S. Jones, E. J. Pollard; Mundalla—Charles Hyde; Talia—W. A. Silvy; Taplan—B. Teakle; Stockport—G. Cant, L. C. Cant; Blackwood—Goldsack; New Residence—B. Freundt, W. Eckermann, E. Eckermann, A. Vickory; Strathalbyn—J. H. Heading, W. H. Roper, H. T. Stacey, A. E. Stacey, P. H. Stacey; Gulnare—W. Burgess, P. G. Thomas, F. Brook, L. G. Smart, C. Smart, F. Belcher, G. Hill, G. K. Davidson; Laura—E. Rohrlach, E. Lynch; Mount Pleasant—D. Learmouth; Lipson—H. W. Nankivell; Lenswood and Forest Range—J. H. Schulz, W. Hamilton, C. Newman, E. Mason; Brentwood—N. Webb, S. Long; Shoal Bay—G. A. Turner; Berri—T. E. Inglis; Petina—J. Green, W. R. Baldock, W. Baldock; Goode—G. D. Klou, B. O. Klou; Iron Bank—C. Coats; Rapid Bay—J. T. Lord; Kybybolite—J. Pettit; Collie—H. Binns, E. Wheaton; Wirrabara—F. Tregenza; Taplan—B. Teacle.

ORCHARD NOTES FOR SOUTHERN DISTRICTS.

[By C. H. BEAUMONT, Orchard Instructor and Inspector.]

If you have not completed planting, do so as soon as possible; but do not go on with the work if the soil gets very wet. The soil must be friable if the planting is to be successful.

Pruning will be continued and will be the main work this month. I would again warn growers not to overdo it; if in doubt, *don't*. Put cuttings together as soon as each tree is finished, so as to be easily picked for the cart or the burner. Pruning of vines will, of course, be pushed on; give the weaker vines less to do, so as to allow them to gain in vigor; clear the cuttings as soon as possible and burn them.

Get on with the ploughing; vary the depth from last year, to prevent hard pan. Disc implements should be more used in our orchards and vineyards. See that all waterways are free always.

Later on spray pumps and swabs will be wanted; have them ready. Also the materials for spraying, lime-sulphur, sulphuric acid, red oil, and bluestone.

On wet days clean up the drying apparatus, trays, cases, &c.

Examine the fruit in cool store and remove any that is damaged.

Work up strawberry and raspberry beds.

THE AGRICULTURAL OUTLOOK.

REPORTS FOR THE MONTH OF JUNE.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective managers:—

Booborowie.—Weather—The weather for June has been extremely cold, and fairly wet. Three hundred and forty points of rain, which is 84 points above the average, have been registered. The total rain since the 1st of January to the 27th of June is 1085 points, which must be considered satisfactory. Crops—The crops have all germinated nicely so far, and there is a considerable amount sown that has not yet come through. Natural feed is plentiful for this time of the year. Stock—All livestock are in good condition and healthy. Pests—Rabbits are fairly numerous, but most landholders are destroying them. Miscellaneous—Farmers have nearly finished seeding.

Kybybolite.—Weather has been cold, some very heavy frosts being experienced intermittently with the severe cold, showery conditions. Some good rains were recorded—2½in. in all for the month—which is ½in. less than the average for June. The total of over 10in. for the half-year to date is ¾in. above the average. Crops have all been sown comparatively early, and only small areas were sown this month. All have germinated splendidly, and made excellent initial growth. Comparatively large areas have been sown down to subterranean clover, and this seed has practically all germinated well. Also Wimmera rye grass has made a good start. Maize grown for grain ripened early in the month, and has been successfully harvested. Berseem sown at the end of February made good growth, and has given its first cut of greenfeed during the latter end of this month. Natural feed has made good growth, although checked somewhat by frosts. However, where good top dressings of phosphate have been given, the grass has not been much affected. Stock are in good condition; lambs generally are very healthy and strong, and the growth of wool up to date has been splendid.

Turretfield.—Weather—Nice rains fell during the month, but they delayed seeding, which is late in this district. A total of 256 points was registered. Many severe frosts were experienced. Crops—The early-sown crops are looking well, although checked by the frosts. Rain has set the land wherever it is red or clayey, and the wheat is not coming through in these places. There is little feed in the district. Stock—A fair number of lambs have been tailed by those who keep sheep, but many farmers in this district do not have a flock. Pests—Lucerne flea is again showing up. Miscellaneous—Stinkwort and hogweed are making ploughing difficult. Pruning has started in the vineyards.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, reported on July 1st, 1924:—

BUTTER.—Since our last report, values have fluctuated owing to the influence of the London market, and also the shrinking in supplies of top grades in Victoria, from which State fairly heavy parcels have been brought to fill the trade's requirements. The latest London reports advise that the market is firm, and it suggests that good prices will be obtainable when surplus butters are being placed in cold stores for overseas shipments. Excellent local demand has ruled during the month, values now being:—Choicest factory and creamery fresh butter in bulk, 1s. 6¾d.; first grade bulk, 1s. 4¾d.; second and third grade, 1s. 2¾d. to 1s. 3d.; best separators and dairies, 1s. 4¼d. to 1s. 6d.; fair quality, 1s. 3¼d. to 1s. 4d.; store and collectors', 1s. 1¼d. to 1s. 3¼d. per lb.

EGGS.—As is expected at this time of the year, consignments came forward in erratic quantities, and the market recorded several fluctuations in prices. However, towards the close of last month, values again improved. Fresh hen, 1s. 9½d.; duck, 1s. 10½d. per dozen.

CHEESE.—Although fairly heavy forwardings came to hand from the South-Eastern factories weekly, the excellent sales put through with local buyers, and the fair demand from Western Australia have kept stocks of new makes cleared at the range of 9d. to 10½d. per lb. for large to loaf. Buyers are only operating on a small scale, however, with semi-matured and matured lines at about 10½d. per lb. for large size.

HONEY.—The consistent demand from the Eastern States and local purchasers resulted in the market firming for the best qualities. Lower grades have also been in good request. Prime clear extracted in liquid condition, 5½d. to 5¾d.; best quality candied lots, 5d. to 5¼d.; lower grades, 4d.; beeswax readily saleable at 1s. 4d. to 1s. 4½d. per lb.

ALMONDS.—The local demand is about equal to the quantities coming forward, with the market slightly firmer:—Brandis, realising 8d.; mixed softshells, 7d.; hardshells, 3½d. to 4d.; kernels, short of requirements, at 1s. 7½d. to 1s. 8d. per lb.

BACON.—For some weeks past, most active demand has ruled for all lines of bacon, and although the local supplies have been ample for this State's requirements, several shipments from Victoria have been handled on this market. Best factory cured sides, 1s. 3d.; best factory cured middles, 1s. 7d.; best factory cured rolls, 1s. 3d. Hutton's "Pineapple" brand hams, 1s. 8d. to 1s. 9d. Hutton's "Pineapple" brand middles, 1s. 7d. per lb.; lard, Hutton's "Pineapple" lard in packets, 11d., in bulk, 10d. per lb.

LIVE POULTRY.—At each sale we yarded a large number of birds, which were submitted to a representative gathering of the trade, and where consignments consisted of prime quality birds, high prices were secured. However, with pens of poor condition lower prices had to be accepted to effect clearances. Buyers have only small stocks on hand apparently, and are anxious to purchase all killable birds. We, therefore, advise consigning at earliest. Crates obtainable on application. The following rates ruled at to-day's auction:—Prime roosters, 4s. 6d. to 5s. 9d. each; nice conditioned cockerels, 2s. 6d. to 4s.; poor conditioned cockerels, 2s. to 2s. 3d.; plump hens, 3s. to 4s. 6d.; medium hens, 2s. 2d. to 2s. 9d.; some pens of weedy sorts lower; geese, 6s. 6d. to 8s.; ducks, good condition, 4s. to 6s. 3d.; ducks, fair condition, 2s. 6d. to 3s. 6d.; turkeys, good to prime condition, 11½d. to 1s. 2d. per lb. live weight; turkeys, fair condition, 9d. to 11d. per lb. live weight; turkeys, fattening sorts, lower; pigeons, 11½d. each.

POTATOES.—Prime new potatoes at 7s. 6d. to 8s. 6d. per cwt. on rail, Mile End.

ONIONS.—Best brown onions at 15s. per cwt. on rail.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., MAY, 1924.

IMPORTS.

Interstate.

Apples (bushels)	248
Bananas (bushels)	8,973
Oranges (bushels)	2
Passion fruit (bushels)	342
Pineapples (bushels)	179
Cabbages (packages)	15
Cauliflowers (packages)	33
Potatoes (bags)	24,416
Onions (bags)	773
Bulbs (packages)	24
Plants (packages)	43
Seeds (packages)	68
Trees (packages)	3
Wine casks, empty (number)	2,607

Fumigated—24 wine casks.

Rejected—386 bags potatoes and 1 second-hand case.

Overseas.

Federal Quarantine Act.

Seeds, &c. (packages)	4,119

EXPORTS.

Federal Commerce Act.

50,791 packages other fresh fruit, 305 packages citrus fruit, 85,917 packages dried fruit, 20 packages preserved fruit, and one package seeds were exported to overseas markets. These were consigned as follows:—

London.

Apples	49,071
Pears	136
Seeds	1
Dried fruit	78,134

India and East.

Dried fruit	150
Apples	1,214
Grapes	20

Africa.

Dried fruit	3,410
Apples	350

New Zealand.

Dried fruit	2,223
Chutney	20
Citrus fruit	305

United States of America.

Dried fruit	2,000

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of and to the end of June, 1924, also the average precipitation to the end of June, and the average annual rainfall.

Station.	For June, 1924.	To end June, 1924.	Av'ge To end June.	Av'ge. Annual Rainfall
Far North and Upper North.				
Oodnadatta	—	1·43	3·09	4·94
Marree	0·01	1·27	3·28	6·07
Farina	0·09	1·31	3·79	6·66
Copley	0·09	1·35	4·72	8·39
Beltana	0·36	1·09	4·89	8·97
Blinman	0·59	1·92	5·39	12·53
Tarcoola	0·48	2·62	3·78	7·74
Hookina	0·95	2·39	6·63	13·46
Hawker	1·46	2·92	6·30	12·92
Wilson	1·28	3·17	6·18	12 58
Gordon	1·06	3·19	5·70	11·55
Quorn	1·11	3·56	6·60	14·21
Port Augusta	0·70	4·10	4·96	9·67
Port Augusta West	0·67	3·71	4·84	9·71
Bruce	0·68	3·01	5·13	10·77
Hammond	0·93	3·85	5·74	11·91
Wilmington	1·74	6·73	8·54	18·29
Willowie	1·20	4·71	6·18	12·57
Melrose	2·64	9·31	11·03	23·40
Booleroo Centre	1·58	6·48	7·28	15·65
Port Germein	1·16	6·25	6·29	12·89
Wirrabara	2·17	8·23	8·54	19·78
Appila	1·52	8·25	6·64	15·00
Cradock	1·24	2·72	4·66	11·52
Carrieton	0·79	2·80	6·03	12·90
Johnburg	0·59	2·99	5·11	10·91
Eurelia	1·15	3·48	6·34	13·54
Orroroo	1·17	3·76	6·63	13·73
Nackara	1·02	3·82	6·13	11·99
Black Rock	1·25	4·12	6·13	12·75
Ucolta	0·67	2·56	5·64	12·04
Peterborough	2·37	5·93	6·32	13·53
Yongala	2·04	6·56	6·54	14·58
Lower North-East.				
Yunta	0·47	1·59	4·60	8·88
Waukaringa	0·60	2·42	4·40	8·54
Mannahill	0·48	1·59	4·45	8·67
Cockburn	0·38	2·20	4·36	8·31
Broken Hill, N.S.W.	0·38	1·81	5·17	9·98
Lower North.				
Port Pirie	1·42	6·85	6·67	13·55
Port Broughton	2·83	8·28	6·95	14·29
Bute	2·28	8·21	7·38	15·78
Laura	2·63	8·13	8·29	18·26
Caltowie	2·38	8·04	7·61	17·20
Jamestown	3·32	10·08	7·73	17·89
Bundaleer W. Wks.	3·10	11·10	7·48	18·09
Gladstone	3·21	10·77	7·26	16·29
Crystal Brook	2·87	10·45	7·38	15·95
Georgetown	4·15	11·75	8·47	18·55
Narridy	2·96	8·16	7·64	16·37
Redhill	2·76	8·19	8·01	16·94

Station.	For June, 1924.	To end June, 1924.	Av'ge To end June.	Av'ge. Annual Rainfall
Lower North—*continued.*				
Spalding	3 27	9·09	8·50	20·27
Gulnare	3·76	12·05	8·28	19·36
Yacka	2·49	9·81	6·95	15·48
Koolunga	2·51	8·75	7·23	15·89
Snowtown	2·48	8·59	7·42	16·07
Brinkworth	2·57	8·63	7·22	16·30
Blyth	2·62	10·25	7·87	17·03
Clare	4·46	14·52	10·09	24·68
Mintaro	4·14	12·01	10·26	23·57
Watervale	4·79	14·38	12·39	27·54
Auburn	3·63	10·21	10·97	24·35
Hoyleton	2·47	8·34	8·04	17·91
Balaklava	1·88	7·38	7·58	15·95
Port Wakefield	1·52	7·51	6·75	13·28
Terowie	1·66	5·24	6·12	13·82
Yarcowie	1·68	5·23	6·49	14·22
Hallett	2·83	9·25	7·07	16·49
Mount Bryan	3·17	10·34	7·16	16·81
Kooringa	2·70	9·12	8·09	18·09
Farrell's Flat	2·51	8·95	8·51	19·00
West of Murray Range.				
Manoora	3·15	9·44	8 25	18·93
Saddleworth	3·01	9·05	9·07	19·78
Marrabel	3·76	10·14	8·87	19·78
Riverton	3·87	10·80	9·54	20·79
Tarlee	2·86	9·69	8·27	17·93
Stockport	2·65	9·14	7·61	16·63
Hamley Bridge	2·28	9·83	7·81	16·59
Kapunda	3·13	10·77	9·06	19·89
Freeling	2·62	8·50	8·25	17·99
Greenock	3·59	10·69	9·69	21·68
Truro	3·95	11·08	9·09	20·20
Stockwell	3·70	11·03	9·15	20·32
Nuriootpa	2·60	8·42	9·49	21·00
Angaston	3·94	10·98	10·18	22·53
Tanunda	4·09	10·70	10·29	22·24
Lyndoch	4·97	12·73	10·43	22·93
Williamstown	4·89	12·13	12·75	27·48
Adelaide Plains.				
Mallala	2·26	9·76	7·98	16·72
Roseworthy	3·01	9·56	8·12	17·35
Gawler	3·56	11·23	9·04	19·11
Two Wells	3·18	10·49	7·78	18·88
Virginia	3·17	9·86	8·26	17·32
Smithfield	3·02	10·53	8·21	17·24
Salisbury	3·16	10·54	8·99	18·51
North Adelaide	4·32	15·85	10·59	22·37
Adelaide	3·70	12·99	10·08	21·08
Glenelg	3·46	10·61	9·02	18·45
Brighton	3·42	10·91	10·31	21·37
Mitcham	4·38	14·12	11·60	24·26
Glen Osmond	5·20	14·72	12·44	25·94
Magill	5·27	17·45	11·34	25·35

RAINFALL—*continued.*

Station	For June, 1924.	To end June, 1924.	Av'ge To end June.	Av'ge Annual Rainfall
Mount Lofty Ranges.				
Teatree Gully.....	4·68	16·71	13·47	27·77
Stirling West	7·76	24·58	20 27	46·82
Uraidla	8·04	24 07	20·98	44·23
Clarendon	5·26	15·97	15·69	33·09
Morphett Vale ...	3·37	13·54	10·95	22·90
Noarlunga	3·16	13·48	9·75	20·41
Willunga	3·28	14·44	12·23	25·99
Aldinga	2·73	11·59	9·84	20·44
Myponga.....	4·04	14·73	13·97	29·80
Normanville	3·30	12·70	9·93	30·70
Yankalilla.....	3·19	12·52	11·53	23·31
Mount Pleasant ..	3·98	11·58	12·35	27·28
Birdwood	4·65	12·64	13·32	29·39
Gumeracha	5·69	17·47	15·32	33·36
Millbrook Reservoir	6·18	19·36	16 91	36·21
Tweedvale	7·26	19·74	16·13	35·65
Woodside	5·59	16·59	14·37	32·20
Ambleside.....	5·96	17·90	15·56	34·82
Nairne	4·41	14·52	13·23	28·44
Mount Barker	5·50	15·50	14·02	31·30
Echunga	5·46	16·96	15·52	33·06
Macclesfield	4·72	14·39	14·67	30·65
Meadows	5·26	19·86	16·47	36·19
Strathalbyn	2·46	10 26	8 82	19·37
Murray Flats and Valley.				
Meningie	2·57	11·48	8·92	18·74
Milang.....	1·45	7·52	7·36	15·45
Langhorne's Creek	2·05	8·69	6·72	14·77
Wellington	2·26	9·20	6·76	14·80
Tailem Bend	2·54	9·78	6·77	14·68
Murray Bridge ...	1·84	7·69	6·57	13·94
Callington	2·17	7·89	7·13	15·49
Mannum	1·28	5·88	5·70	11·66
Palmer	1·63	5·45	6·75	15·46
Sedan	1·95	5·77	5·84	12·27
Swan Reach	1·16	5·10	5·15	11·06
Blanchetown	0·67	3·90	4·94	10·09
Eudunda.....	2·32	6·47	7·87	17·51
Sutherlands	1·33	4·55	5·03	11·20
Morgan	1·00	4·17	4·28	9·30
Waikerie	1·02	4·92	4·83	9·87
Overland Corner ..	1·00	3·80	5·25	11·03
Loxton	1·52	5·21	5·91	12·50
Renmark	1·16	4·20	5·09	11·06
Monash	1·36	4·79	—	—
West of Spencer's Gulf.				
Eucla.....	0·81	2·44	5·47	10·01
White Well.....	1·17	3·90	4·41	9·20
Fowler's Bay	1·71	4·83	6·27	12·14
Penong	2·21	7·19	6·26	12·53
Ceduna	1·60	4·43	3·81	10·25
Smoky Bay	1·90	4·54	5·24	10·08
Petina	1·77	4·89	5·92	12·05
Streaky Bay.....	1·87	5·85	7·42	13·07
Talia	2·74	6·41	6·54	15·32
Port Elliston.....	1·69	7·43	7·87	19·56
Cummins	2·47	5·21	7·87	15·66
Port Lincoln.....	2·41	7·17	9·11	19·66

Station	For June, 1924.	To end June, 1924.	Av'ge To end June.	Av'ge Annual Rainfall
West of Spencer's Gulf—*continued.*				
Tumby	1·88	4·81	6·10	14·56
Carrow	1·45	4·03	6·12	14·42
Arno Bay	1·27	4·22	5·89	13·06
Cowell	0·78	3 47	5·77	11·63
Minnipa	2·05	5·50	7·31	15·51
Ungarra	2·37	5·91		—
Darke's Peak	2·39	5·88		—
Kimba	1·32	3·95		—
Yorke Peninsula.				
Wallaroo	2·12	7·80	7 23	14·15
Kadina	2·21	8·46	7·88	16·02
Moonta	2·51	9·26	7·76	15·35
Green's Plains	2·13	7·90	7·53	15·86
Maitland	3·83	13·13	9·67	20·17
Ardrossan	1·57	6·51	6·84	14·18
Port Victoria	2·73	9 14	7·59	15·50
Curramulka	3 04	9·26	8·42	18·20
Minlaton	2·87	9·21	8·48	17·90
Brentwood	2·44	8·10	7·36	15 83
Stansbury	3·04	9·08	7·94	17·01
Warooka	2·51	7·83	8·24	17·80
Yorketown	1·73	7·50	8·01	17·24
Edithburgh	1·46	7·22	8·91	16·58
South and South-East.				
Cape Borda	3·88	11·72	12 02	25·08
Kingscote	1·61	6·54	8·85	19·04
Penneshaw	1·68	6·87	8·23	19·47
Victor Harbor	2·11	8·92	10·03	21·49
Port Elliot	2·33	9·31	9·40	20·12
Goolwa	1·90	7·72	8·40	17·89
Mindarie	1·69	6·32	—	-
Alawoona	1·60	6·29	—	—
Karoonda	2·02	7·88		—
Sandalwood	2·11	6·67	—	—
Meribah	1·62	6·17	-	—
Pinnaroo	2·32	7·18	7·13	15·50
Parilla	2·21	6·77	6·47	14·51
Lameroo	3·35	10·12	7·16	16·32
Parrakie	2·12	7·76	6·29	14·58
Geranium	2·19	8·96	7·13	16·62
Peake	2·53	11·07	7·45	16·73
Cooke's Plains ...	2·88	11·28	6·85	15·14
Coomandook	2·85	11·15	7·76	17·49
Coonalpyn	3·18	12·22	7·74	17·40
Tintinara	1·99	10·45	8·27	18·70
Keith.....	1·85	9·73	8 02	18·22
Bordertown	2·14	10·22	8·59	19·39
Wolseley	2·41	10·17	7·97	18·12
Frances	2·61	10·18	8·45	19·73
Naracoorte	2·80	11·70	10·00	22·25
Penola	2·40	11·15	11·61	26·26
Lucindale	3·41	13·69	10·21	23·09
Kingston.....	3·17	12·81	11·43	24·51
Robe	2·59	10·77	11·46	24·65
Beachport.....	3·03	10·51	12·88	27·30
Millicent	3·77	15·00	13·76	29·59
Kalangadoo	3·14	15·97	13·69	32·47
Mount Gambier ..	2·65	12·92	13·78	31·29

AGRICULTURAL BUREAU REPORTS.

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Belalie North	*	12	9
Berri	*	16	13
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Blackwood	*	21	18
Block E	*	—	—
Blyth	*	5	2
Booleroo Centre	‡	11	15
Borrika	*	—	—
Brentwood	1194	10	14
Brinkley	1205	12	9
Brinkworth	1186	—	—
Bundaleer Springs	*	—	—
Bute	*	15	12
Butler	1198	—	—
Calca	*	—	—
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Clare	‡	—	—
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Denial Bay	*	—	—
Edillilie	*	26	30
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Frances	1217	26	30
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Georgetown	*	12	9
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Maltee	*	11	15
Mangalo	*	—	—
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Mount Bryan	*	—	—
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Mount Compass	*	—	—
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Mount Remarkable	*	—	—
Mount Schank	*	15	12
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Mypolonga	1209	16	13
Myponga	*	—	—
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Paruna	*	—	—
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Penola	*	5	2
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Pinnaroo	‡	18	15
Pompoota	*	9	13
Poochera	1201	5	2
Port Broughton	*	11	15
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Salisbury	*	1	5
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Sandalwood	A.M.	—	—
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Tantanoola	1220	12	9
Taplan	1209	15	12
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Two Wells	*	—	—
Uraidla & Summertown	1216	7	4
Veitch	*	—	—
Virginia	*	—	—
Waikerie	*	—	—
Wall	*	—	—
Wanbi	*	—	—
Warcowie	*	15	12
Watervale	*	—	—
Weavers	1197	14	11
Wepowie	1181	15	12
Whyte-Yarcowie	*	—	—
Wilkawatt	*	12	9
Williamstown (Women's)	1193-4	2	6
Williamstown	1194	11	15
Willowie	1182	16	13
Wilmington	*	16	13
Windsor	*	—	—
Winkie	‡	—	—
Wirrabara	1186	—	—
Wirrega	*	—	—
Wirrilla	1194	12	9
Wirrulla	1205	12	—
Wolowa	*	—	—
Wookata	*	—	—
Wudinna	*	—	—
Wynarka	1208	—	—
Yacka	*	15	12
Yadnarie	1202 4	15	12
Yallunda Flat	1205	—	—
Yaninee	*	—	—
Yeelanna	*	12	9
Yongala Vale	*	—	—
Yorketown	*	—	—
Younghusband	*	17	14

* No report received during the month of June. † Formal. ‡ Held over until next month.
A.M. Annual Meeting.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

HOOKINA (Average annual rainfall, 12in.).

May 15th.—Present 10 members and 6 visitors.

FENCING.—The following short paper was read by Mr. R. Wardleworth:—"A fence that is well erected and kept in good repair is an asset to the farm, because it adds to the value of the property and saves time which otherwise would be spent in looking for stock. A good, serviceable 6-wire fence can be constructed of posts 5ft. 6in. long, placed 20in. into the ground, 12yds. apart, with 2 hardwood droppers in between; strainers 7ft. long, 3ft. in the ground, and set at distances from 100yds. to 120yds. This fence should be 3ft. 10in. high, and with a barb on top will prove both sheep and cattle proof. Wire gates are a continual source of trouble. A very useful, cheap, and easily constructed gate can be made with 3in. x 1in. stringy bark." In the discussion that followed, Mr. S. Stone said that in ground that would not drift, netting made the best fence, and ultimately would prove just as cheap as a wire fence, because there was no time lost running after sheep that would get through a wire fence. Mr. B. A. Murphy did not favor the use or droppers where large stock were kept, but would make a fence 4ft. high, using gum or pine posts 5yds. apart. Mr. H. V. Henschke said where timber was plentiful, he would not use droppers, but when it was difficult and expensive to obtain timber, he would use iron posts.

MORCHARD (Average annual rainfall, 13.50in.).

May 17th.—Present: 13 members.

FARM GATES.—In the course of a short paper dealing with this subject, Mr. N. S. Lillecrapp said good gates meant a considerable saving of time on the farm. He spoke in favor of wide wire gates in the paddocks for teams and implements, and well-hung stringy bark gates around the homestead. The gates should be hung with a strut from the bottom hinge to the top corner, with a barbed wire on top to keep animals from leaning on the top of the gate. He did not advise iron gates because they were difficult to erect, on account of the weight, and gates made with iron piping were easily bent and broken. In discussing the paper, Mr. Kupke said some years ago he bought 20 iron pipe gates, and at the present time there were only four in use. He favored well-hung wooden gates. A keen discussion took place on the subject "Adulteration of Pollard and Bran." Members tabled samples or pollard and bran, which contained 45 per cent. of ribs and cocky chaff, and other rubbish.

WEPOWIE (Average annual rainfall, 13in. to 14in.).

May 13th.—Present: eight members.

FALLOWING.—The following paper was read by Mr. L. R. Jasper:—"Fallowis recognised as one of the most important factors in successful wheat growing. The work should be commenced as soon as seeding is finished, and completed, if possible, by the end of August. Late fallow does not give the best results, especially if the ground is dry. When ploughing is commenced, care

should be taken to see that each share is cutting the correct width of ground evenly, and that the mould boards turn the soil completely over. Three-and-a-half inches is deep enough for this district. After ploughing is finished, a heavy set of harrows can be run over the fallow to break the land down. After the land has been cultivated, it should be left until the summer, and if summer rains fall the harrows should again be used. Where stubble land is to be fallowed, the cultivator can be used, but it would first be necessary to burn the straw off after harvest, and then, when seeding is finished, the land can be cultivated with a draught cultivator to a depth of about 3in. If worked a couple of times with the spring-tyne cultivator, the condition of the land will be improved.'' In the discussion that followed, Mr. T. F. Orrock favored ploughing between 4in. and 5in. deep for fallowing, and thought a better way to prepare for fallow on stubble would be to cultivate directly after harvest, then one extra working could be given in the spring.

ORROROO, May 24th.—There was a good attendance of members and visitors at the May meeting of the Branch, when several questions of local interst were brought forward for consideration.

HOOKINA, June 12th.—A paper, ''Waste on the Farm,'' was read from the *Journal of Agriculture,* and an interesting discussion followed.

WILLOWIE, May 15th.—Several labor-saving devices were exhibited. Mr. E. Jacka showed a simple improvement to the bag lifter whereby the chain could be held permanently in position. Mr. A. Bartlett tabled a new style of eyebolt. Mr. S. Mountford exhibited an improved form of staging for water troughs.

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

GLADSTONE (Average annual rainfall, 16in.).
Present: 20 members.

CARE OF FARM MACHINERY.—In a paper dealing with this subject, Mr. G. Smallacombe said in view of the high price of farm implements, it was surprising that so few farmers displayed concern as to the proper care and maintenance of the machinery. One could not go into any of the rural areas without noticing ploughs, cultivators, &c., lying out in the paddocks where they were last used. The harvester and other costly implements containing woodwork should be placed under shelter, but in many instances the protection afforded was not sufficient to keep fowls and birds from roosting on the machines. If a farmer were compelled to expose his machinery to the weather, it should be painted regularly to keep the rain and sun from getting into the woodwork and rotting it. Farm machinery required constant attention if it was to be kept in proper repair, and every machine should be put in good working order before it was sent into the field. Seeding and harvesting were the two busiest periods of the year on the farm, and the farmer could not afford to lose any valuable time when putting in and taking off the crop. Therefore, he should overhaul all the machines before commencing. All worn-out parts should be replaced with new ones. Fencing wire should not be used instead of bolts in any machine, but new bolts put in and screwed up tightly to keep everything in its place. After a machine has been idle for some time, kerosine should be run through all the bearings to ensure a free passage for the oil. The binder knives should be sharpened, and the fingers tightened so that the knife moved freely. If the knife track were kept well oiled and the knife free from clogging material, the machine would run smoothly. It was a good plan to have a drum of water at the end of the paddock, and every round or two put some water on the knife. The harvester should receive special attention, particularly the comb and winnower. The comb should be closed if needed, so that it would strip clean, and the winnower and elevators should be so regulated that they would not lose any wheat. In the discussion that followed, Mr. C. O. Bennett said it was most

essential that all bolts and nuts should be kept tight. Not only did the vibration consequent on a lack of care in that respect tend to wear away the mechanism, but, as a further consequence, the machine itself would go out of correct alignment. Mr. T. J. Brown contended that the proper time to attend to machinery was after it had come out of the crop, rather than when it went into the crop. Mr. J. J. Gale said farmers generally were very careless about the machinery. He had frequently seen valuable machinery left out in the open, sometimes for the purpose of blocking up a gateway. Every farmer should keep a notebook and a pencil, and jot down what was wanted in the way of parts and repairs from time to time. All machinery should be kept under cover when not in use, and painted when necessary Keeping nuts screwed up was essential. Mr. A. J. P. Kumnick said it behoved every farmer to see that the implements were well looked after and housed. Replying to Mr. Black, Mr. Smallacombe said that for woodwork he would recommend a shed with a straw roof in preference to one with an iron roof. That was not a matter of great moment, however. Their main concern should be to see that the implements were kept dry. Mr. R. E. Lines always made it a practice to screw up the machinery after harvest. He did not keep a book, but wrote on the machine with a piece of chalk the names of the parts required.

GLADSTONE (Average annual rainfall, 16in.).
Present: 11 members.

MAINTENANCE OF ROADS.—Mr. Jas. Potter read the following paper:—"The question of the bad state of country roads is often discussed by farmers, yet the farmers themselves are a good deal to blame, because of the heavy loads that are carted on the roads. Before trollies came into general use, a farmer carting a 50 bag load of 4bush. bags of wheat, was supposed to be carting a good load, which is equal to about 70 bags at the present time, but nowadays farmers are not satisfied unless they are carting from 90 to 130 bags on the

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trollies. Not any road can be expected to carry such a weight without getting cut into holes. During the rainy season, motor cars push out the dirt from the holes, which makes it difficult to keep the roads in repair. If farmers want to assist in keeping the roads in good repair, they should try to avoid cutting up the roads during the summer. If a road is once allowed to get into a bad condition, much money is required to put it in order again. A new metal road will cost from £6 to £11 per chain, and if a farmer has a mile or more of road frontage, with the rates at from £3 up to £20, he should readily see that his money does not go far towards doing very much road work in a year. Then there are some farmers who charge a high royalty when contractors are desirious of obtaining stone. When the council endeavors to repair and make roads, farmers should allow the contractors to have stone at a very low cost, if not free, because the cost of the stone will be included in the contractors' charges." In discussing the paper, Mr. E. T. Hollit said his observations had led him to the opinion that the worst roads were those upon which wagons seldom travelled. With regard to the matter of stones, he was prepared to give all that were to be obtained on his land provided the district council carted them on to the roads. Mr. A. B. Blesing, who had had 10 years' experience of district council work, had noticed that it was not the farmers who did most of the damage; teamsters were in a great measure responsible for the bad conditions in which roads were frequently found. Teamsters, when they found the roads difficult to pass over, were prone to double the strength of the team and pull the load over the difficult section. Despite the earnestness of councillors, it was very difficult to get contractors to carry out work as it should be done. Contractors would give up the job if they could not get their own way. As for inspectors, it was not possible to get a full-salaried man for the position. That official had other duties to perform, and, therefore, district councillors had arrived at the conclusion that they had to put up with things as they found them, do the best they could, and endure the abuse of the ratepayers. The trouble was that the bad condition of the roads was due, in no small measure, to want of thought on the part of those using them. If rural communities would only exercise commonsense—a little care and thoughtfulness—complaints about the evil conditions of the roads would be considerably lessened. Mr. E. T. Brown hardly thought the farmers should be blamed so much. Motor cars were very severe on the roads. Mr. C. H. Lines thought that if the tire inspectors kept the weights down, it would, to a great extent, do away with bad roads. He would gladly give all the stone on his property to the council if the latter body would undertake not to let the stock out. Mr. Potter in replying to Mr. Lines said he agreed with Mr. Blesing that it was difficult to get a good man as inspector. The salary of the inspector being insufficient, he could not give adequate time to the job. Mr. G. M. Black endorsed the remarks of Mr. Blesing. His experience was that very few ratepayers attended the meetings of the district councils, and consequently they had no idea of the difficulties with which councillors had to contend. Mr. J. Eley said it would pay farmers using roads to do something towards keeping them in repair. He knew of cases in which, owing to the bad state of the roads, the sum of £150 per year would hardly cover the cost of repairs to vehicles. If much less than that sum had been devoted to the repair and upkeep of roads, the necessity for repairs to vehicles would have been almost eliminated.

MANNANARIE.

May 15th.—Present: 18 members and 5 visitors.

QUESTION BOX.—The meeting took the form of a Question Box when several interesting topics were discussed:—Mr. H. E. B. Robinson asked the best method of scalding a pig. Most members favored dipping the pig in boiling water until the hair could be pulled off. The pig should then be lifted out of the water and scraped quickly. Some members considered boiling water too hot, and thought the heat correct when blood dissolved quickly in the water. Mr. C. N. Bretag asked the most suitable method of top dressing grass land with super. Members favored top dressing with the drill, with the hoes on the ground, in preference to drilling with tubes removed or broadcasting. In reply to a question from Mr. J. Symons regarding the proper time to ring bark gum trees, Mr. A. L. Jones suggested doing the work during the summer and early autumn. Mr. W. Crawford asked what age lambs should be when tailing, and if the testicles

should be drawn until the strings broke, or whether the strings should be cut when the testicles were drawn sufficiently. Messrs. A. T. and J. Symons favored drawing the testicles until the strings broke, because the broken strings healed quickly and checked bleeding. Messrs. R. Baynes, and W. Crawford were of the opinion that pulling the testicles until the strings broke was very severe on the lamb and thought the strings should be cut, or held very tightly with the fingers on the pouch, and so cause the strings to break off short.

NELSHABY.

February 23rd.—Present: 18 members and visitors.

ECONOMY ON THE FARM.—Mr. C. Plenty read the following paper:—"The high prices of land, implements, and commodities, compared with the low prices ruling for farm produce, make it imperative for the present-day farmer to put into operation the most economical methods of production. Waste will creep in on well-supervised farms. By economy, I do not wish to convey the impression of saving money under any and all circumstances, because, after all, 'a penny wise and pound foolish' policy is nearly, if not quite so disastrous, as allowing waste. Empty cornsacks at seeding time are frequently thrown into a corner of the barn and allowed to remain there until harvest, and by that time 50 per cent. may have been rendered useless by rats and mice. A very good plan to prevent such damage is to sling the bags on wires suspended from the barn roof. Thread a bottle with a hole in the bottom on either end of the wires to prevent mice climbing down. The purchasing of a blacksmith's outfit is one of the most economical investments, and no farm should be without this equipment. Making shares for the plough and cultivator are ideal wet-day jobs. I have effected as large a saving as 18s. on a dozen 5in. cultivator shares. A 4½in. piece of steel cut diagonally will make a 5½in. cultivator share, and reduce waste to a minimum. Take every care of the harness. A very good collar rack can be made with a piece of 2in. x 3in. timber and a few old dray or wagon wheel spokes. Bore large holes the required distance apart in the piece of timber, point the spokes, and drive them into the timber. Give the spokes a slight upward tilt to prevent the collars slipping, and fix the rack at a convenient height in the harness house. Be careful in the selection of the implements, choose the largest and most labor saving that the farm will warrant, and also see that machines are obtained that will work with satisfaction in your district."

MARKETING FARM PRODUCE.—At a further meeting, held on March 22nd, Mr. F. De Silver, in the course of a short paper entitled "Marketing Farm Produce," said produce from the farm should always be placed on the market in the most attractive manner. If chaff were sold it was important that the hay should be cut at the right stage, in order to ensure that it would be of a good color. It was also necessary to examine the chaffcutter and see that the knives were properly sharpened. Wheat harvested for grain should be thoroughly cleaned, and all foreign grains and rubbish removed. A short discussion followed.

NELSHABY.

April 18th.—Present: 14 members.

SIDE LINES.—The following paper was read by Mr. P. Noble:—"There are many side lines that can be undertaken successfully in conjunction with wheat growing. In fact, some are almost a necessity to obtain the best results from wheat growing. One side line on a wheat farm is the cultivation of oats. They make an excellent rotation crop, and open up the way for a side line in hay and chaff. Probably the most important side line on the wheat farm is the management of sheep. This necessitates good fences, properly subdivided paddocks, and a good water supply. Barley growing as a side line will enable the farmer to keep cows and pigs successfully. This, however, I would not advise any wheat farmer to adopt unless he has plenty of surplus labor. Poultry run on proper lines, are an excellent side line. The surplus wheat can be used for feeding, and the birds will provide the farm with eggs and meat. There are various kinds of seeds and plants that can be raised for which there is always a ready sale, but care must be exercised that these do not clash with the main harvest. An acre or two of almonds, currants, or wattles will prove profitable." In the discussion that followed, Mr. L. Roberts thought sheep were the best line to run in conjunction with wheat growing. If fences were good, sheep did not require a great deal of attention. Cows, pigs, and poultry were good paying lines, but required

proper attention. He also thought breeding good draught horses a payable proposition. Mr. A. M. Lawrie said that all the lines mentioned were good, but too many lines should not be attempted. Only those which could be properly attended to without neglecting regular cropping operations should be adopted.

BRINKWORTH, June 16th.—Eighteen members and three visitors attended the June meeting, when a paper, "Early Settlement on the West Coast" was read by Mr. C. Provis. An interesting discussion ensued, and the writer of the paper replied to numerous questions.

GULNARE, May 21st.—Nineteen members attended the inaugural meeting of the above Branch, when the Assistant Dairy Expert (Mr. H. J. Apps) attended and delivered an address, "Popular Breeds of Cattle." It was decided that meetings of the Branch should be held on Wednesday, on or before full moon, at 8 p.m.

WIRRABARA, May 17th.—Fifteen members and several visitors attended the May meeting. A paper, "Tilling the Soil," was contributed by Mr. F. Carson, and an interesting discussion followed.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BETHEL.

May 6th.—Present: nine members.

FARM MANAGEMENT.—Mr. E. N. Siegert read the following paper:—"A farm of, say, 500 acres should be fenced into four paddocks, three paddocks of about 150 acres for cultivation, and a 50-acre paddock for stock. The cultivation paddocks should be cropped in rotatian, one fallowed, one cropped, and the other left for grazing a flock of, say, 100 well-bred ewes. These should, on an average year, turn in 80 per cent. lambs which could be marketed when fattened. The farmer should also keep five good Jersey cows and about six good breeding sows which could be fed on milk and barley. It would be advisable to have a small plot of lucerne to provide green feed for the cows and pigs in the summer. Seeding should commence the first week in May, and the wheat should be pickled. Ten acres of oats and five of barley should be sown for fodder, the balance of the land could be cropped with wheat. Fallowing should commence the latter end of June, and be completed early in August, after which the land should be worked with the harrows. Shearing should be started at the end of August, so that the flock could have the run of the fallow to keep the weeds under control. Cultivation should be commenced in September, and the work continued until haytime. When the hay is cut, it should be allowed to lie on the ground for two or three days before being stooked. If carting is commenced directly cutting is finished, the hay should be in the stack before the wheat is ripe. The wheat which is to be left for seed should be harvested last, in order to be certain that the grain is properly ripe. The hay stack should be covered as soon as the wheat is carted, to prevent the hay being spoiled with early rains. A large straw stack should be built in the stock paddock to provide shelter during the winter." A keen and interesting discussion followed.

NANTAWARRA (Average annual rainfall, 15.90in.).

May 15th.—Present: six members.

DAIRYING ON THE FARM.—Mr. G. Herbert read the following paper:—"Side lines on the farm are paying propositions. The farmer who grows wheat alone and depends on that for a living is not so sure of showing a profit each year as the man who is more industrious and has various sidelines. On most farms sheep, cows, pigs, and fowls can be found, but with the exception of sheep these are kept to provide household necessities. I am of the opinion that they could be run on a larger scale, and thereby become a source of income to the farmer." Continuing, Mr. Herbert stated that a cow of fair average quality should produce 8lbs. of butter per week from March to October inclusive—32 weeks—a

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production of 256lbs., and 6lbs. per week for the remaining 20 weeks of the year. The average price of butter for the eight winter months was 1s. 6d. per lb., and for the remainder of the year 1s. 10d. per lb. The production should therefore total £30 4s. for the year. One man should be able to look after 20 cows, and if the animals kept in full profit all the year, would return £604, but a nine months' milking period was all that could reasonably be expected from each cow, and that would, therefore, reduce the income to £453. In reference to expenses, 15lbs. of chaff and 3lbs. of oats (with a small paddock) should constitute a fair day's feed for a cow. For 20 cows it would be 39 tons hay and 135 bags oats for nine months. The three remaining months the cows would be in the paddock, and feeding would be based at 1s. per head per week for dry feed, and 1s 6d. for green feed, which would average approximately 1s. 3d. per head per week. A small quantity of salt was an essential for the welfare of the herd. The expenditure on the herd for 12 months he estimated as follows:—39 tons hay at £4 per ton, £156; 135 bags oats at 4s. per bush., £81; 20 head cattle paddocking at 1s. 3d., 12 weeks, £15; salt, £1; man's wages, £1 15s. and board 15s. per week, £130; Total, £383. That left £70 profit for the year. The heifer calves would more than replace losses, and the bull calves could be marketed at a profit. The capital outlay would only be a matter of £200. In the discussion that followed, Mr. R. Uppill did not approve of keeping cows as a side line, owing to the amount of work involved in giving them proper attention. He was of the opinion that the feed required by the dairy herd could be better utilised by feeding it to sheep. Mr. A. F. Herbert favored keeping cows. The farmer would be well repaid for the amount of work done, and for the attention given the cows by the profit they returned. Members generally were against keeping cows owing to the work they involved.

OWEN.

May 16th.—Present: five members.

HAND FEEDING SHEEP.—Mr. H. Bowyer contributed the following paper:—"From experience I am convinced that it pays to hand feed sheep during the months of April and May. This keeps the sheep in good order, and enables the ewes to rear the lambs without losing condition. During the autumn, one often hears a farmer say, 'I am getting short of feed, and will have to sell some sheep; if I could only keep them until the rains come I would have plenty of feed.' The same man often has plenty of hay, but never thinks of feeding it to his sheep. The stock are sent to the market, and the farmer has to accept considerably less than their real value. After the rain comes, he buys back the same class of sheep at, say, 7s. 6d. per head dearer. I do not wish to convey the idea that sheep should be entirely hand fed, but rather that the natural herbage should be supplemented by hand feeding. A good plan is to give the sheep a mixed ration. I am now feeding a flock of 440 sheep, ½ ton of oaten hay, and ½ ton of oaten chaff, mixed with about 200lb. of Cape barley each week, and I find some take to the chaff whilst others prefer the hay. Taking the hay at £1 10s., chaff £2, barley 12s.; a total of £4 2s.—2¼d. per sheep, allowing £1 per week for labor, or ¼d. per head, giving a total of 2¾d. per head. Eight weeks' feeding would amount to 1s. 10d. per head, thus showing a profit of 5s. 8d. per head. If this plan is adopted, more sheep can be carried, and the droppings will help to keep the land in better heart, and grow more feed. There are many points in favor of hand feeding sheep. They become quiet and docile, and enable the farmer to work amongst them during the lambing season, which is absolutely necessary. The sheep become more contented, and by hand feeding it saves losses through stinkwort. The blowfly pest is becoming a serious menace, especially at this season of the year, and it is a common occurrence to find 8 per cent. to 10 per cent. of the lambing ewes struck every few days. All that can be done is to clip the wool closely where the sheep has been struck, and apply a dressing. The sheep that are roughly shorn around the crutch, suffer the most. From inquiries made, I find that closely crutching the sheep in April is the best cure for the blowfly, because it keeps the sheep clean and dry. It would be advisable for some of the farmers to purchase a small hand-shearing machine for crutching the sheep. Another serious pest to the sheep is the fox, which accounts for heavy losses of lambs. It behoves every farmer who has sheep to do his best in destroying the foxes, and poisoning is the most effective method. The bait should be cut up into small pieces and treated with strychnine, to which a little

carbonate of soda might be added. It is also advisable to drag a trail behind the cart and distribute the baits about 100yds. apart, late in the evening. Lamb-killing foxes are very cunning, preferring to kill a lamb every night, but small birds or mice, or the tongue of a young lamb that has just been killed, will sometimes prove a tempting bait. It is also a good plan, if possible, to move the sheep into another paddock." In the discussion that followed, Mr. W. J. Marshman stated that it was necessary to hand feed sheep because of the greatly improved prices for both meat and wool. He favored feeding on 1lb. chaff and ½lb. of grain per sheep per day. For troughs he used sheets of galvanized iron, riveted together, the ends being bent to form the trough. The trough could be kept in position with wires and boards fastened to the ends. Such a trough was cheap and effective, and would accommodate 30 sheep. He advised placing the troughs near water, and keeping salt in one trough. Salt creates a thirst, and the sheep drank more water and kept in better condition. He favored crutching with a machine. Mr. A. N. Freebairn thought it payed to feed, if only to save the break in wool. When stinkwort was prevalent, hand feeding provided a change in the diet, and thus made stinkwort less dangerous. He advised the following mixture for preventing blowflies from striking sheep:—Tar, two pints, castor-oil one pint, and 1 dessertspoonful of arsenic. Mr. R. S. Harkness said that only by hand feeding could a farmer in the settled areas keep his flock intact. During a dry autumn, the sheep kept their condition better, and the wool staple maintained an evenness of strength and elasticity. Hand feeding helped the lambing flock, the ewes kept better condition, and if grain was added to the feed, it stimulated the milk flow. The bag feeder was economical and very efficient. In making a feeder, super bags sewn end to end the required length served the purpose, and were generally plentiful on a farm. A single wooden post should be placed in the ground at either end of the proposed trough. Pairs of iron droppers the width of the trough should be firmly placed into the ground, 4ft. 6in. apart between the wooden posts. Wires could then be threaded through the edges of the bagging and the iron droppers, and pulled tight, and fastened at the wooden posts at the end of the trough. The wires should be threaded through the iron droppers high enough to keep the bagging 2in. or 3in. off the ground, and thus prevent dampness affecting the feed during wet weather. A third wire should also be threaded through the bottom of the feeder and fastened to the wooden posts to prevent the feed blowing about during windy weather, and thus minimise waste. Provided that sheep could feed at either side of the trough, two sheep could feed to every foot of troughing. He preferred short chaffed hay mixed with oats. One-and-a-half pounds of both chaff and grain per day would fatten a sheep. Barley and peas, or cocky chaff and molasses, could also be fed to advantage.

OWEN.

June 13th.—Present: eight members.

DAIRYING.—The following paper, under the title "Are Cows Profitable?" was read by Mr. A. N. Freebairn:—"In this paper, reference is not made to the commercial dairy farmer, but to the wheat farmer who keeps cows to provide household necessities, and also as a side line to cropping operations. A much-debated subject amongst farmers is, 'Are Cows Profitable?' Some farmers who say that cows do not pay, hold that opinion because they are too lazy to milk the animals, but it is admitted that cows are a nuisance. It is evident that the farmer who devotes much time to cows will neglect, to a certain extent, wheat growing and sheep breeding operations. Many a farmer in receipt of a large cream cheque wonders why the farm is not paying. This has been noticed repeatedly. A small stubble paddock burnt off and sown with barley, will return more than the produce from a number of cows; and, in addition, there is the barley stubble for the horses in harvest, and later, a splendid growth of feed, which is very suitable for lambing ewes. There is also the slavery of milking, morning and night, in all weathers, whereas sowing and reaping barley does not involve much work. If all cows except three were sold, and extra sheep bought, it would make conditions on the farm better; more time could be devoted to wheat and sheep, and the absence of the cream cheque would be more than compensated for. Most Australian farmers are too prosperous to bother with cows, though it must be remembered that in the north of this State.

when there had been a failure of the wheat crop, the cow had paid the bills, thus enabling the farmer to remain on the land. For the farmer who only keeps sufficient cows to supply the family, and a few pounds of butter to reduce the store bill, any class of cows seems to be good enough. The so-called 'mongrel' is able to live on a very small allowance of fodder, and is affected by neither heat nor cold. Under similar conditions, the pedigreed animal would not give results, if, indeed, it were able to exist at all. If the farmer considers cows profitable, and desires to go in for milk or cream, it is, of course, advisable to breed only from the best stock, and to employ a bull whose progeny have proved profitable cows. It is also advisable to feed the cows with wholesome milk-producing foods. I favor the dual purpose animal as the most suitable breed for the farmer.'' In the discussion that followed, Mr. C. S. Marshman considered dairying a good side line on the farm, but if carried out extensively in conjunction with wheat growing, both industries often failed. He thought that dairying was not practicable in that district, because there was not sufficient feed throughout the year. Cows were useful to eat up roughage. Mr. W. J. Marshman though dairying a drudgery, and it certainly was not an eight-hours-a-day job. He doubted if cows could compete with sheep in the Middle North at the present time. Pigs helped considerably to make cows pay; the pigs he had kept and fed on the skim milk from cows had brought in nearly as much revenue as the cows. He had found that since he had kept a pure bred bull, the heifers had improved, and developed into better cows. He also favored allowing the calves to run with the cows for at least three days, the ''beastings'' were necessary to assist in keeping the calf's digestive system in order. Cows should be hand fed, except when the herbage was in flower, when they were able to obtain a well-balanced ration. Of the cereals, he favored oats, because they stimulated the milk flow, and kept the cows in good health. For cream production, he favored the Jersey or Ayrshire. Good dairy cows could be selected from all breeds. Cheap labor was essential to make dairying a successful undertaking. He stated that it was difficult to determine where the profit from the cows terminated. Produce from cows was necessary in the kitchen. If wheat decreased to 3s. per bushel and fat lambs dropped in value, farmers would be glad to keep cows, sell the cream, and feed skim milk to pigs. For cream and butter produce, he preferred the Jersey breed, and for general purposes, the Shorthorn. Cows of the latter breed always brought a good price for beef after they had been finished with as milkers. He considered cows on a farm were profitable, if not directly, then certainly indirectly.

STOCKPORT (Average annual rainfall, 15.89in.).

April 17th.—Present: 12 members.

The report of the delegates to the Lower Northern Bureau Conference was received, and the question of inaugurating crop competitions was discussed.

REARING CALVES.—Eleven members attended a further meeting held on May 16th, when Mr. G. Cant, in the course of a paper dealing with the above subject, said—In the first place, it was essential to have the services of a first-class bull. The heifer calves should be selected from the best cows. After birth, he thought it advisable to allow the calf to drink as much milk from the cow as it required, then the calf should be taken from the mother. It was not necessary to feed it for 24 hours. An important part was to see that a clean, warm, dry place was provided for the calf. Clean feeding buckets were absolutely essential to the good health of the calf. For the first few days, the calf could be fed on new milk, after which a little skim milk should be added to the ration, the skim milk being gradually increased until the calf was able to take all separated milk. When the calf began to chew the bedding, a ration of chaffed hay, crushed oats, and bran should be fed. After the calf was weaned, it should always be supplied with ample fodder. The speaker considered that calves reared in the manner suggested, would be quite ready to come in at two years of age.

TARLEE.

April 22nd.—Present: 11 members and visitors.

MOST PROFITABLE COW FOR THE FARM.—Mr. A. T. Hill read the following paper:—''This question is one which is largely influenced by the opinion of the farmer, because if he does not favor a particular breed, he is liable to neglect

it, and the result will be a failure. If, on the other hand, he has a fancy for any one breed, he will give it every care and attention, and this goes far towards making it a success. I favor the Holstein Friesian. They are hardy animals, splendidly constituted, and renowned for large yields of both milk and butterfat. The Friesian is the backbone of the dairying industry in Holland, Denmark, England, Canada, the United States, and New Zealand, and is also becoming very popular in Australia.'' Mr. Hill then traced the early breeding and the introduction of the breed into Holland. Continuing he said, ''The contention that the Friesians are not economical producers, and that they require considerably more feed than the other breeds, is purely a prejudiced statement by breeders of other types of cattle. Recent experiments conducted in America prove that the breed are the most economical producers. A cow of any breed requires an abundance of food if she is a good producer, and the fallacious idea of a cow giving a large volume of milk on scanty food has time and again proved to be erroneous. That they must be dairy cattle of the first order, is evidenced by the great length of breeding, and it must not be forgotten that nearly all the modern breeds in Europe owe, in no small measure, the ability to milk through the influence of Friesian blood in their veins.'' Three classes of cattle established in the Netherlands and the color standards required were also explained by the speaker. ''No one will deny the fact that the Friesians are great milkers; they do not possibly produce milk as high in butterfat content as some of the other breeds, but with the large flow of milk which the Friesian is noted for, the aggregate yield more than covers the deficiency in butterfat. In the River Murray Herd Testing Association, Friesians have won two years in succession in both the yield of milk and butterfat content, against all other breeds. Again, in the Official Test of Pure Bred Cows in South Australia, ending June 30th, 1923, six Friesians produced the highest yield in both milk and butterfat. In South Australia, Friesians have the records for the production of milk and butterfat in the single cow tests for 24 hours, 7 days, 30 days, and 365 days.'' Records of champion performances of Holstein cows in America and

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Canada were then cited by Mr. Hill. "The figures quoted above are official, and prove that not only are the black and whites big milkers, but that they are also great butterfat producers. One of the reasons why the black and whites produce such large yields is the fact that they are able to maintain their flow so consistently through the lactation period. The Friesian is considered to be a large eater, and this is argued as being a disadvantage by the Jersey fanciers. The Holstein Friesian is a large-framed cow, but she has something to show for what she consumes, and will always market well for beef. Naturally, too, Friesians produce large calves, and these at two months old would be worth about £1 per head more than the Jerseys. If the Holstein calves are fattened as steers, there would be a considerable difference, because the butcher has a strong dislike for Jerseys. The majority of farmers keep pigs, and consider them a paying proposition, and more so when plenty of milk is available. The Friesian, because of its great milk flow, not only gives high butterfat yields, but suppiles large quantities of skim milk for the pigs. From the point of view of milk, butterfat, or beef production, the Friesian leads the way, and I am confident that the Friesian is the most profitable cow, whether for wholesale milk production, or for the supply of cream." In the discussion that followed, Mr. A. M. Fuller considered that the most profitable cow for the farmer to keep would necessarily be a dual purpose beast. He gave preference to the Milking Shorthorn. He regretted that farmers generally did not pay enough attention to the selection and grading of their dairy herd. That type of beast was a wonderful milker, and of a particularly robust constitution, and eagerly sought after by the butchers. The calves were also exceptionally good "doers," and noted for their early maturity. Mr. J. McInerny advocated the Milking Shorthorn for either milk or a butchers' beast. Mr. L. Arthur believed the Milking Shorthorn to be a good type of cow for the farmer to keep, but like all cows, needed a good deal of care. Mr. W. Neate thought the Friesian a great producer, taking her all the year round, and she also produced a good calf. Mr. W. S. Kelly said it was to be regretted that districts did not fix on a particular breed of cattle to suit their districts, as was done in Britain. He pointed out the advantage of the subsidy offered by the Government for pure bred bulls, and urged farmers to take advantage of the offer.

TARLEE.

May 20th.—Present; 19 members and five visitors.

FARM MANAGEMENT.—In the course of an address dealing with the subject, "How to Make Our Farms Pay," Mr. A. S. Toll, of Gawler, said he had experienced all the difficulties common to the man on the land—drought, fire, water shortage, disappointing crops, &c., but he found that those could be overcome by industry and the application of scientific methods and a good business and general management of the farm. It was not necessary to have large holdings, but it was essential to adopt a system of rotation. The system adopted by the speaker was one-third fallow, one-third second crop, one-third first crop, making a rotation of bare fallow, wheat, and oats or barley on stubble, thereby giving the whole of the farm a change to oats or barley once in three years. That system provided a great preventive measure against "take-all" and saved the soil from wheat "sickness." If the system of half-fallow and half-crop were adopted, oats should be sown occasionally, even on fallow, and the result would be very beneficial. If, however, the former system of rotation was followed, it would be advisable to give the stubble land good tillage. It should be cultivated in the autumn, after having been fed bare by sheep. He advised carrying as many sheep as possible. They were a very profitable side line, and in addition to keeping down weeds, their droppings fertilised the soil. He considered that the Tarlee district could, with the former system of rotation in operation, easily carry one sheep to three acres for fattening by the end of fallowing, the sheep having been purchased off shears, or one ewe to four acres. Hand feeding the sheep during autumn or whilst waiting for stubble paddocks for grazing should be carried out. He preferred wethers off shears, because they did not require so much attention as ewes. The latter required the most attention during the busiest times on the farm, either with flies or lambing. By careful buying and proper management, sheep would usually show enough profit to pay for super and meat. He believed in persistent heavy dressings of super, not less than 120lbs. to 140lbs. per acre of 36 per cent. super. He firmly believed

in the advantages of early fallow. The work should be finished by the end of August, and subsequent cultivation performed whenever a surface crust or weeds rendered it necessary. The stubbles should not be burned, but stocked heavily, when the straw could be ploughed in without any difficulty. He considered it false economy to try to work with a horse short, a machine short, or a man short. The work should be done systematically, and up to schedule. If the men employed on the farm received good treatment and good wages, and worked reasonable hours, very little labor trouble would be experienced. He considered is important to keep all farm buildings, fences, and other improvements in good repair. By-products of the farm should not be wasted, but by keeping a pig or two, fowls, and a few cows, they could be turned into profitable side lines. He considered it necessary for every farmer to keep a simple system of books. A short discussion followed.

WILLIAMSTOWN WOMEN'S.

May 7th.—Present: 15 members.

BURNS AND SCALDS.—A paper under the title "Burns and Scalds" was contributed by Mrs. W. Grigg. From this paper the following is printed:—"Children are very liable to accidents from boiling water, other fluids, and burns. When a scald is at all extensive, it is of very serious import. A child with one-third of the surface of its body burned or scalded will probably die from shock; if it survives the shock, some internal inflammation may subsequently develop, causing death. The extent of a scald is a more important consideration than its depth. A large surface burn is more dangerous than a small deep one. Where the scald is extensive, it is advisable not to remove any clothes. Cover all the exposed scald with old, clean, linen rags or handkerchiefs soaked well in some sweet oil, and send at once for the doctor. The oil can be mixed with equal parts of lime water, and shaken thoroughly in a bottle before it is applied to the parts. The lime water relieves the pain, but it would be foolish to wait long for lime or lime water, because the injured parts should be protected from the air as quickly as possible. If oil is not at hand, vaseline may be used, or even butter or cream. The application of flour directly to the scald interferes with the easy treatment of the wounds by the physician. In smaller burns, when the clothes adhere to the injury, it should be softened with warm oil before the clothes are removed, and the wound immediately covered with equal parts of oil and lime water, or vaseline. Picric acid is an excellent application for scalds and burns, about a teaspoonful should be dissolved in ½ pint of hot water, and the wound covered with clean, old, linen rags or handkerchiefs soaked in the lotions. The first dressing should remain for couple of days without removal, and subsequently, the wounds should be dressed daily. When there is an offensive smell, it is necessary to dress the wounds twice daily. [A medical practitioner to whom this paper was shown prior to publication, made the suggestion that the attendant should put the dressing on in small strips about 1in. wide.

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This renders the subsequent dressings easier and less painful.—Ed.] Drinks of hot milk or hot milk, coffee, and water are helpful in overcoming the shock. They are infinitely better than alcohol in any form. Alcoholic drinks are harmful, as their temporary stimulating effects are always followed by increased depression. The constant supply of hot water in teaspoonful doses acts as a good temporary stimulant to the heart and circulation. Hot gruel, groats, or other easily-digested foods should be given at regular intervals.

LIGHT'S PASS, May 15th.—Two papers, one championing the tractor, and one the horse, were read on the subject "Tractor *v.* Horse in Orchard and Vineyard." Mr. L. Plush read the paper favoring the tractor, and Mr. B. Scholz supported the claims of the horse. An instructive discussion followed.

LYNDOCH, May 15th.—A paper dealing with the subject "Farming" was read by Mr. H. W. Lames, and an interesting discussion ensued. Other subjects of local interest were also discussed.

ROSEDALE, April 16th.—Twelve members attended the April meeting, when Mr. V. Hocking read a paper, "Principles of Breeding."

On May 20th, a further meeting of the Branch was held, and a number of subjects of local and timely interest were discussed.

STOCKPORT, June 10th.—Mr. R. Gillespie (Dairy Assistant) attended the meeting, and gave a demonstration of milk testing, and an address on subjects relating to the dairying industry.

WILLIAMSTOWN, May 16th.—Mr. S. R. Cockburn delivered an address. "Fertilizing Pasture Lands." A paper dealing with the same subject was read by Mr. F. E. Rix.

WILLIAMSTOWN, June 13th.—Mr. J. B. Harris (Orchard Instructor and Inspector for the District) delivered an address, "Pruning," and demonstrated his remarks with blackboard illustrations.

WILLIAMSTOWN WOMEN'S, June 4th.—Mr. J. S. Hammatt read an extract, "Hydatids," and an instructive discussion followed. Mrs. Filsen tabled home-made sausages, and gave members a recipe for making them.

WIRRILLA, May 17th.—Mr. F. Coleman (Member of the Advisory Board of Agriculture) attended the meeting and delivered an address, "Wheats for Hay and Grain." A collection of varieties of seed wheat was exhibited by Mr. Coleman.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

BRENTWOOD.

April 17th.—Present: 19 members and four visitors.

THE STOCK-CARRYING CAPACITY OF THE FARM.—Mr. A. E. Twartz read the following paper—"With the present high prices prevailing for wool, every attention should be given to the improvement of pastures. Some soils do not lend themselves to profitable cultivation, others require periodical cultivations interspersed with temporary pasture, whilst others lend themselves to continuous crop growing. Considerations in this district will naturally apply to the first two classes of soil. The means of increasing the livestock carrying capacity of the farm are:—(1) manuring or top-dressing, (2) growing fodder crops, (3) encouraging natural grasses and edible plants and checking the spread of plants of inferior feeding value, (4) systematic handling of stock and management of pastures. In regard to No. 1, it has already been proved that heavier applications of fertilisers improve the herbage. Good results are coming from every part of the State where pastures have been top dressed annually with 1cwt. of superphosphate. This has been found in many instances to more than double the livestock carrying capacity. (2) I recommend for fodder crops in this district, Tunis barley and an early variety of oats. The barley makes rapid growth early in the winter, whilst the oats remain green later in the summer. Much is to be gained by this system, because in some cases the soils are light and deficient

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in humus, and continual cropping with cereals tends to exhaust the humus, and naturally the crops suffer. One way of returning humus to the soil is by crowding stock on small areas, and to do this fodder crops must be grown. (3) Much improvement in pastures can be wrought by attention to this point. Noxious weeds only take the place of other more serviceable plants. Manuring helps considerably to sweeten the soil, and in sweet soils clovers and good grasses are better able to hold their own against those plants partial to sour soil conditions, and which are usually of poor feeding value. (4) The systematic handling of stock and management of pastures has, in an indirect way, something to do with the improvement of pastures. For instance, great harm can be done by overstocking. Good judgment is required in feeding off a pasture. It is always better to remove stock a few days too soon that a few days too late, both for the benefit of the pasture and the stock. Whilst on this point, mention must be made of rabbits, for they do considerable damage in eating the sweet and better parts of the pasture, and destroy the plants by eating them too close to the roots. By increasing the stock-carrying capacity, not only the pastures are improved, but the livestock that is reared in the district will also be improved." In the discussion that followed, Mr. C. H. Boundy said the present price of wool and mutton would well repay more attention being devoted to fodder crops. He thought if more attention were given to stock, it would possibly prove a better paying proposition than wheat growing. During the present year he intended to top dress with super an area of virgin land, and would report the results later. Mr. J. J. Honner considered that the matter under discussion was only in its infancy in South Australia. He agreed that in some instances stock would pay much better than wheat. Older agricultural countries had found it necessary to resort to stock raising in conjunction with wheat growing. They had been successful, and under much greater difficulties than were experienced in South Australia. Men on small holdings often found it difficult to supply grazing for the stock, but the remedy was in growing suitable fodder crops. He spoke strongly of the value of spreading stable manure on the land, instead of dumping it behind the stable, as was often done. He agreed with the paper in respect to drilling barley and oats on hay ground, to fallow later, and so gain on the sheep and lambs more than could be gained by earlier fallow. Mr. J. Boundy said the subject was one of vital importance to the whole farming community. He drew a comparison between the stock-carrying capacity of the district 20 years ago and that of the present time. The advent of super had resulted in a wonderful increase in stock on the farms. Systematic manuring had increased stock-carrying, as well as increased wool yields, and enabled farmers to grow better crops of cereals, as well as natural fodder plants. Such being the case, farmers would do well to consider the matter of manuring and intense culture more than they had done in the past. He cited a case in which the value of heavy applications of stable manure could be seen in the herbage and crops after some years. In reply, Mr. Twartz said it was a capital idea to put hay ground under fodder crops, and it would compensate handsomely for the late fallow. He had a small paddock which had been treated with stable manure, and at first with 50lbs. of super, but now 1cwt. to the acre, which had been cropped continuously for 20 years. For the last nine years he had grown alternate fodder and hay crops, the last hay crop yielding two tons to the acre. He thought the use of ensilage for ewes and lambs might well be tested.

KILKERAN.

May 13th.—Present: 10 members.

Mr. A. Wakefield, in opening a discussion on the subject "The Best Implement for Sandy Soil," said the spring tyne cultivator was the best implement. It left the land in a rough "ridgy" condition, which prevented the soil from drifting, and for its size it was the lightest implement, which was a great consideration in sandy soil. Mr. S. T. Keightly endorsed the Chairman's remarks, and emphasised the necessity for working very wide shares, on the spring tyne, 7in. preferably, because with the wide shares large ridges would be made, and the soil would be less likely to drift. Mr. G. F. Sawade had proved that it paid to fallow light or sandy soils. Such soils should always be worked whilst in a wet condition.

WHEAT PICKLING.—In discussing this subject, Mr. R. Wakefield stated that pickling was a most important part of the operations of all cereal growers. He had used formalin, which had given better results than bluestone. He had used the "barrel" method when treating the grain. Mr. S. T. Keightley endorsed the previous speaker's views, as regards formalin. Shovelling the grain and solution on the floor was undoubtedly the best method of being sure that every grain came into contact with the pickle. Mr. E. H. Dutschke remarked that one point in favor of bluestone as a pickle was that wheat could be sown any length of time after pickling, and germination was not affected. He had used formalin, however, because it was much cleaner to handle. Mr. S. J. Jones favored formalin; he had sown it after pickling at different lengths of time from the following day after, to about a week after pickling, and found no difference in germination. Members generally favored formalin, the strength of the mixture being 1lb. of formalin to 40galls. of water for wheat, and a little stronger for barley.

ARTHURTON, April 24th.—The meeting discussed the subject "Wheat Crop Competitions," and Mr. M. T. Hynes was elected as the Branch representative under the scheme proposed by the Advisory Board. Messrs. Hynes and Henschke gave a fine report of the Yorke Peninsula Conference.

MOONTA, May 24th.—Mr. R. C. Kitto gave an interesting account of a trip he had recently made by motor car from Moonta to Sydney.

PASKEVILLE, June 17th.—Various matter of local interest were discussed. It was resolved, "That the members of the Paskeville Agricultural Bureau pledge themselves to discontinue the growing of red wheats."

WEAVERS, May 13th.—Mr. F. A. Anderson read a paper, "Increasing the Population throughout the Agricultural Areas of the Commonwealth," and an interesting discussion ensued.

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WESTERN DISTRICT.

BUTLER (Average annual rainfall, 16.61in.).

April 16th.—Present: 12 members and two visitors.

TANNING HIDES.—Messrs. W. and V. Pfitzner contributed the following paper:—"Tanning leather with the method described below is an easy process, and takes very little time. First, the hide should be put in a mixture of lime and water, so that the hair can be scraped off easily. The hide should be laid on a flat and clean surface and scraped on both sides to take off the hair, fat, meat, etc. It should then be left in clean water until the tan liquid is ready. The liquid consists of one 4gall. bucket of wild peach or quondong bark added to 20galls. of water. When cold, the hide can be immersed in the solution. Care should be taken that the tan is not too strong until the hide commences to show the color of the liquid. Then the liquid can be made as strong as possible by adding more scalded bark. The addition of three buckets of bark will in most cases prove sufficient. All that remains to do is to air the hide once a week. The process will take three to four months. Care should be taken when airing the hide that it is not allowed to become dry and stiff. When the hide becomes heavy it is a sure sign that it is nearly tanned. After the hide is tanned, it should be washed in two or three waters, but not allowed to become dry until the dressing is applied. When the tanner is applying the dressing—a mixture of mutton fat and beeswax—the hide should be hung over a rail, and the dressing well rubbed into the leather on the flesh side with a block of wood. The hide can then be left to dry until required for use. If the dressing is not applied, the leather will become hard and wrinkly, and will stretch, crack, and break when used. Any red bark will tan leather. Tanning a rabbit skin will take three weeks, a kangaroo skin six to eight weeks, and a hide three months."

KOPPIO (Average annual rainfall, 22.40in.).

May 20th.—Present: 12 members.

TOP DRESSING PASTURES.—In the course of a discussion on this subject some members expressed the opinion that high grade super was not suitable for top dressing. Mr. W. R. Richardson thought that high grade fertiliser contained too much free acid. The Hon. Secretary (Mr. M. T. Gardner) mentioned that he had top dressed a 50-acre paddock last year with high grade super at the rate of about 50lbs. per acre, with wonderfully good results. *Poisoning Crows.*—Mr. V. W. Gardner asked if members knew of any effective means of poisoning crows. Several members recommended a blood mixture spread on a sheep skin, whilst others thought that powdered glass or S.A.P. mixed in small fat balls was very effective. One member said he had seen them caught with a baited fish hook attached to a copper wire.

LIPSON.

April 26th.—Present: 11 members and visitors.

CARE OF MACHINERY.—The following paper was read by Mr. D. C. Stewart:—"Too often a farmer buys a machine, uses it for a fraction of the season, then leaves it in the open or under a tree at the mercy of the sun and rain for the rest of the 12 months. Again, some farmers pull the machines under a straw or bush covering, where water drips on them all through the winter. A machine exposed to the weather for nine months in this district will deteriorate almost as much as if that machine were working all the time. When a farmer buys a machine, he should see that a weather-proof shed is provided. Farmers do not use enough paint on the machines. Machinery, if painted every two or three years will last a lifetime. Paint prevents rust, preserves timber, and gives the machine a new life. The farmer should use judgment when working a machine, especially if it is a new one. Some men are inclined to think that because the machine is new, it will work without any attention, but such is seldom the case. So far as the care of the machine is concerned, the first season is the most important. All nuts should be kept tightened, and all bearings watched to see that they are correctly adjusted. Use good oil, spend a little time each dinner time and morning with a spanner. If a bolt happens to break, do not use wire to effect a repair, but see that a few spare bolts are carried in the tool box in case of breakages. Be sure that the pieces of the machine that have come apart as the result of the breaking of the bolt are in position when the bolt is screwed up tightly." A good discussion followed, in which all members took part.

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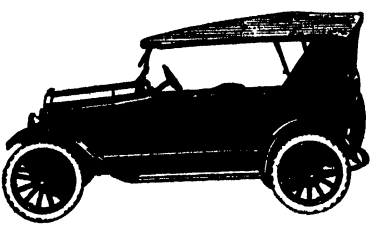
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"The Car to date has put up an excellent performance, coming through all the hills quite easily on top gear. We had a very fine run right through to Mount Gambier, and did the Coorong in a little over 5½ hours, and averaged 25 miles per gallon and 1 pint of oil."

"The way in which the Car stood up to stresses and strains has been wonderful. The Car averaged 26 miles to the gallon of petrol and 360 miles to the pint of oil."

"I have averaged 2,400 miles to the gallon of oil and the petrol consumption showed an average of 27 miles per gallon."

A Ride in the RUGBY will Convince you of its Superiority.



H. C. RICHARDS
LIMITED.
Richards' Buildings, Currie Street.

LIPSON.

May 17th.—Present: 15 members.

HANDLING AND BREAKING YOUNG HORSES.—Mr. W. O'Connor read the following paper:—"Bad habits of horses are very often caused by the faulty handling and breaking by an inexperienced horseman. Kind treatment and careful handling are the main points to be observed in breaking in young animals. See that all tackle is sound and strong before catching a young horse, and so give it no chance to break away. When caught, the colt should be held and thoroughly handled, and an endeavor made to accustom it to being touched on any part of the body before putting it into the team or vehicle. Handling a young horse in an open bridle is the most satisfactory method. Teach the horse to tie up, using a strong rope in the first place, until the colt is thoroughly broken in. Also teach it to lead and drive before it is worked in chains, and there will then be little or no subsequent troubles." A short discussion followed.

MILTALIE (Average annual rainfall, 14.55in.).

May 17th.—Present: seven members and visitors.

CARE AND TREATMENT OF HORSES.—In the course of a short paper dealing with this subject, Mr. J. C. Story referred to the important part the farm team played in the working of the property, and said the animals should be watered and fed regularly. Care should be taken to groom the shoulders to assist in minimising trouble with sore shoulders. Well-fitting collars and harness should also be used, and if possible, the collars should be re-lined every two years, because the sweat hardened the stuffing, which caused lumps and sores on the shoulders. Bran acted as a blood tonic, and the team should occasionally be given a liberal allowance with the ordinary chaff ration. Draught horses should not be asked to travel at a fast pace, about five miles per hour, when pulling a heavy load, should be the maximum pace. Concluding, Mr. Story said, "Treat the horses well and kindly and they will do good work." A short discussion followed.

MOUNT HOPE.

May 17th.—Present: nine members.)

ECONOMY ON THE FARM.—Mr. R. L. Myers read the following paper:—"One of the main factors of successful farming is economy, but at the same time beware of false economy. For instance, it is not profitable to use ½cwt. of super instead of 1cwt., neither is it economical to provide the stock with insufficient feed, and neglect the implements. Economy, combined with good judgment, will always play a very important part in successful farming. Some farmers do not take any care of the empty super bags, while the careful and good manager will shake them out well, or given them a good wash and hang them out to dry, when they can be used for many purposes. The good farmer will cover his haystack, have no losses through mice and wet weather, and will always give his animals good sound food and clean water. He will also clean out the troughs and tanks before they become too dirty, in order to always maintain a good state of health among the animals. It is also economical to erect fences and keep them in good order, because once the stock make a habit of crawling and breaking fences, they are hard to stop, and will give endless trouble in trying to keep them enclosed in the paddocks."

PETINA (Average annual rainfall, 13.19in.).

May 24th.

Eleven members were present at the May meeting. The question of destroying "buck bush" was brought forward for discussion. Mr. G. Roberts said that the best plan to adopt was to remove the beam from a set of harrows, and run the harrows—one horse to each leaf—over the ground. The bushes should be left for a week until thoroughly dry, when they could be burnt. Mr. W. Stone said for dealing with the bushes on fallow land, he had stripped an old drill, and with long chains had fastened a set of harrows without the beam—behind the drive. The bushes were gathered into large heaps, and could be burnt when properly dry. The chains should be about 9ft. in length in order to make large heaps of the bushes.

POOCHERA.

April 2nd.—Present: 18 members.

PICKLING WHEAT.—In the course of a paper dealing with this subject, Mr. F. R. Gosling said pickling wheat was absolutely necessary, and it was first advisable to run the seed through a grader to remove all weed seeds and cracked grain, and to ensure a clean sample. After referring to various methods used for pickling wheat, Mr. Gosling said he had used a mechanical wheat pickler for the last three seasons, and had had very good results. The solution he used consisted of 11lb. of bluestone and 11lb. of salt to 10galls. of water. In the discussion that followed Mr. C. Bohlin said he had used 11lb. of bluestone to 8galls. of water, and yet there was smut in the crop. Mr V. Newbon asked which implement was the best for harvesting wheat for seed. Mr. Prowett considered wheat gathered with the stripper gave a better germination. Mr. McCormack asked if the combined drill and cultivator was a success in scrub land. Mr. Bohlin did not think stumps would break the tynes. Mr. Humphris had had good results from a spring tyne cultivator in rough country. Mr. Gosling asked which wheats yielded best in the district. Members favored Gluyas. Mr. Prowett asked if Ford was a suitable wheat for the district. Mr. Bohlin said Ford was subject to smut, otherwise it was successful. Mr. McCormack used nine balls of binder twine on 5½ acres of Ford in cutting portion of the crop for hay. Mr. Prowett had good results from Currawa. Mr. Gosling, in reply to a question, considered Major too late for the district. Mr. A. B. Bockelberg asked if it was advisable to harrow dry ploughing before the drill. Mr. Bohlin favored harrowing before and after the drill. Mr. Prowett asked if it was advisable to harrow after the wheat had showed up. Mr. Bohlin believed it an advantage to harrow in August. Mr. Gosling had seen good results from harrowing after the crop was up on Yorke Peninsula, but had not tried it on the West Coast. Members expressed the opinion that harrows could be safely used in sandy soils, if worked whilst the ground was wet. Several other subjects were also discussed.

POOCHERA.

May 7th.—Present: 17 members.

TANK CONSTRUCTION.—Mr. C. O. Bohlin read the following paper:—"Tank construction and the conservation of water are of the highest importance to the majority of farmers on the West Coast. From recent investigations, I find that the quickest and most economical way of constructing underground tanks is to excavate with a plough and earth scoop. When excavating a tank, it is advantageous to work the sides down with a slope inwards, because when concreting the walls is commenced, there will be no need for concrete boards. It has been found very economical for farm tanks in this district to utilise the rubble in the bottom of the tank excavations for making the concrete, and 1 of cement to 12 or 14 of rubble has proved to be a very satisfactory concrete mixture. For the flush plaster, a mixture of 5 to 1 is recommended. Then take 2 of good, sharp, washed sand and 1 of cement to make a finishing cement plaster. The tank should be roofed as soon as completed, because the sun on the fresh cement often causes it to crack. The shade also eliminates evaporation of water. When selecting a site for a tank it is advisable, if possible, to select a position a little above water lodgments, in order to give the overflow water a chance of draining away from the tank." In the discussion that followed, Mr. J. B. Brockelberg thought the walls and sides of the tank should be treated with cement wash or tar. Mr. W. A. Gosling had obtained most success with a dry stone wall tank. He had used about four drums of cement on a 25,000gall. tank.

ROBERTS AND VERRAN.

May 15th.—Present: 12 members and visitors.

DISC v. SHARE PLOUGHS.—In the course of a discussion on this subject, Mr. G. Smith favored a share plough wherever it could be used, but where land was very bushy or carried much stubble, the share plough could not do a good job. Bushy land that was to be fallowed should have the shoots cut, and be fire-raked, and then ploughed with a share plough. Mr. H. Simmons favored a share

plough, because it left a firm seed bed, and pulled out stumps. All fallowing should be done with a heavy share plough, and subsequent working could be done with a skim plough or share cultivator. Mr. H. Lewis said the share plough was the better implement to work if the land was clear. A disc plough did not break all the ground, because the discs missed the soil when jumping over stumps and stones. Mr. A. Smith agreed that a share plough should be used wherever possible, but it was advisable to have a disc plough on hand to plough land that was too rough for a foot plough. The land was cleared more quickly, however, by using the latter. Mr. S. Simmons considered that in new country farmers should endeavor to have one of each type of plough. The foot plough should be used wherever possible, but there was usually some land too rough to do a good job with any implement but a disc. Mr. C. Masters said if foot ploughs were used more extensively better crops would be grown. The disc plough did not break the soil as well as a share plough. Especially did that apply to the twin-disc plough, the smaller discs of which, when the bearings became worn, did not cut as deeply as the front discs. On bushy land a disc had to be used, but wherever possible the share plough should be used. Mr. A. T. Cowley said the object of ploughing was to break and pulverise the soil. The share plough cut the soil to an even depth, whereas the disc left ridges underneath. He thought, however, that under favorable conditions the disc pulverised the soil better than a share plough. He considered it advisable to have both types of plough in that district. Mr. D. Jonas said a foot plough was needed to do first-class work, but for that district he favored a disc until the bushes were killed. He had done satisfactory work with a drill hauled by a tractor. Mr. W. H. Whittaker favored the share plough. He had used a twin-disc, and found that when the bearings became worn the small discs missed a lot of ground, but by using discs all the same size it eliminated that to a great extent. He favored shallow ploughing with a foot plough. Mr. B. Evans preferred the share plough wherever possible, especially for fallowing. For very bushy land, however, he favored a disc. Mr. M. Masters agreed that the share plough should be used wherever possible. It had the advantage of cutting through and tearing the roots over which the disc would ride.

TALIA.

May 10th.—Present: 12 members and visitors.

THE AGRICULTURAL BUREAU.—Mr. D. McBeath read the following paper:—"Sufficient interest is not taken in the meetings of the Agricultural Bureau in this district. One repeatedly hears farmers complaining about the Government Departments not helping primary producers, and yet, here is a Department set wholly aside for rural education, which is the most substantial help the man on the land can have. All advice in connection with crops, stock, gardening, dairying, &c., is given free by Government experts to members of the Bureau, and each member receives the *Agricultural Journal* monthly free of charge. Members should take an interest in Bureau meetings, and always come prepared to ask questions, and if possible, give practical advice to other members. Another very important matter is, that when a member is asked to write a paper, he should not neglect his duty, because the reading of the paper and the discussion that ensues are the principal educational factors of the Bureau. When no paper is read it is difficult to arouse a good discussion, consequently interest is lost, and probably the next meeting finds a smaller attendance. Considering that membership, advice, *Journal*, &c., are absolutely free, members should endeavor to take more interest in the Bureau, and if a farmer thinks that he has learned all that there is to be learned about agriculture, let him not be selfish, but come to the meetings and give other members the benefit of his knowledge. Remember the motto at the foot of the Bureau meeting cards—'Membership carries responsibility'—so be punctual and regular in attendance."

YADNARIE (Average annual rainfall, 14.09in.).

April 15th.—Present: 12 members and visitors.

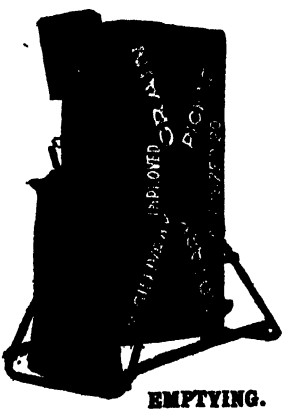
SEEDING.—The following paper was read by Mr. G. Langston:—"Every careful farmer should commence seeding operations immediately after harvest by making all preparations, so that when the precise time comes, he may commence

without delay. Operations should be well carried out on thoroughly prepared land, or there will not be much chance of satisfactory yields at harvest time. The period before actual seeding can be taken up with putting implements in order, setting up the drill, and having all chains and swings in readiness. Seed can be pickled in advance, so that it may have time to dry out. A good method of pickling is to use a fair-sized barrel (let into the ground), and to have a draining contrivance rigged up on to which the butt of wheat can be dropped when pulled out. The bag of wheat should be separated into two butts, thereby given the seed plenty of room to swell, and to allow the pickling solution a good chance to soak through. One pound of bluestone to 10galls. of water is ample to counteract bunt and smut. Dry sowing can be done early on new land, and very good crops can sometimes be grown, but there is always a danger of their coming along too early. New land should be given a good ploughing for the first crop, and after that the cultivator will do. It should be the plan of every farmer to have as much fallow as possible, because better results are obtained from fallow land. Fallow should be worked after practically every rain, when the weeds make their appearance; although weeds can be killed more easily during dry weather, the land is not worked so well as when wet. Sheep are a great help to the farmer in keeping down weeds, especially when one is too busy to get on the land, but on light soils, if the flock is too large, they may start the fallow drifting. If the soil is of a heavier nature, sheep are exceptionally useful to keep fallow clean, break up clods of earth, and to pack the soil. If the fallow has been worked a time or two during the year, one working is sufficient at seeding time, but the weeds should be given a good chance to mature. If the land is well cleared the cultivator is the best implement, because more land can be got over, and it can be worked to a depth of 2in. and leave a good solid bottom for the seed bed. The cultivator should be followed immediately

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by the drill, and if the farmer has the opportunity, a light set of harrows can be used to cover the seed. A good rolling is also beneficial to the land. It is a matter of judgment as to what seed should be sown, but Gluyas has a fairly good name for early wheat in this district, whilst Florence, Federation, Currawa, Major, and Queen Fan have all proved their merits. Early and mid-season wheats show a good return if sown at the rate of 45lbs. of seed and 60lbs. of super. The combination drill and cultivator is a great help to the farmer if his land is free from rubbish and stumps. Seeding operations should start about the second week in April, and should not be carried on later than the end of June." Mr. J. J. Deer did not agree with the strength of solution prescribed for pickling—it was too weak. He always used one to five when dipping, and one to four when sprinkling. He would sow 70lbs. of seed to the acre instead of 45lbs., and would use a combine instead of a cultivator if the land were suitable. Mr F. W. Jericho said he would work new land lightly, and thought wheat could be pickled before seeding commenced. Mr. J. A. Serotski used a one to eight solution, and always stirred the wheat whilst in the pickle. Mr. A. Spriggs thought 60lbs. of wheat should be sown to the acre of early varieties, and 45lbs. of stooling wheats such as Marquis. He considered 1½lbs. of bluestone to 10galls of water quite weak enough for pickling, and he always left the butts of wheat in the pickle for two minutes. One could pickle ahead if care was exercised to see that the wheat was perfectly dry before stacking. Mr. H. Degner used a one to eight solution, and placed the wheat in a kerosene tin instead of a bag when immersing it in the pickle. He considered 45lbs. of seed and 60lbs. of super to the acre sufficient in the early part of the season, and later on he advocated sowing more seed and super to the acre.

YADNARIE (Average annual rainfall, 14.09in.).

May 20th.—Present: 16 members and visitors.

FARMERS' RESPONSIBILITIES.—Mr. W. E. Hier, in the course of a paper under this heading, pointed out that farmers should be more careful in keeping their wheats true to name by avoiding negligent practices at seeding and harvest time, also to use care when reaping wheat for seed so as not to crack or injure it in any other way. Mr. F. W. Jericho thought farmers should avoid growing and marketing weeds and the seed of same with the wheat. He did not believe in sowing wheat without pickling under any conditions. Mr. O. Forbes said he made it a practice to sow wheat for seed on new ground or clean fallow, and when drilling left a small space between the different sorts, and then cut two widths with the binder around the different varieties. He did not think there was much danger of smut in wheat sown before the opening rains. Mr. O. Kobelt thought a lot of weeds were spread through feeding of same to stock. Mr. W. L. Brown never pickled before the opening rains, but after that he pickled every variety of wheat. He always used bluestone. Mr. P. Dolling always obtained seed wheat and oats from reputable farmers, and even then it was difficult to get wheat true to type. He was a strong believer in grading.

BIG SWAMP, May 15th.—A number of subjects of local and timely interest were brought before the meeting for consideration, and an instructive discussion ensued.

COLLIE, May 31st.—Ten members and several visitors attended the May meeting, which took the form of a "Question Box." A number of local and timely topics were discussed.

GREEN PATCH, May 28th.—Members discussed the cultivation of fodders and grasses for the Port Lincoln district, and Mr. C. Dorward proposed that each member of the Branch should sow a plot of any variety of fodder crop. Mr. E. E. Chapman offered a prize of one guinea for the best fodder plot of from 1 to 20 acres, and Mr. C. Dorward consented to give 10s. 6d. for the second prize. Mr. T. Pronde was prepared to donate 10s. 6d. for the best 10 acres or a larger area and Mr. H. Schwerdt offered a similar amount for second prize.

McLACHLAN, May 3rd.—An instructive paper, "A comparison of Australian and Canadian Conditions," was read by Rev. Owen, and an interesting discussion ensued.

SMOKY BAY, May 17th.—Discussion took place on the subjects, "Experimental Plots," Water Reticulation," and "Farm Tractors."

WIRRULLA, April 19th.—Twenty members and a large number of visitors attended the meeting, which took the form of a social evening. The Manager of the Minippa Experimental Farm (Mr. Rowland Hill) attended, and presented certificates to the successful competitors in the local crop competitions. The meeting concluded with a dance and supper.

YALLUNDA FLAT, May 17th.—Mr. S. C. Fairbrother, who had sown a plot of 15 acres with Sudan grass at the rate of about 15lbs. of seed and 100lbs. of super to the acre, considered that the crop would carry five sheep to the acre. Other matters of timely interest were also discussed.

EASTERN DISTRICT.

BRINKLEY.

May 17th.

TOP DRESSING.—The following paper was submitted by Mr. L. W. Rust:—"Let us assume that a farmer has 1,500 acres of land cleared and fit for cultivation. In making plans for the season's crop, he has also to consider the amount of land he can fallow, and yet leave sufficient for feeding purposes for stock, which it can be assumed consists of, say, 15 horses, a few cows, and 150 sheep. Under ordinary conditions, he would require at least 500 acres, in this district, for feed. To make this portion of the farm more profitable, I suggest top dressing about 200 acres with not less than 60lbs. to the acre of 45 per cent superphosphate, which would mean an outlay of about £24, and it would be possible to carry 250 sheep instead of 150, in addition to other stock, because the feed would be more plentiful, and of better quality. In figures, this would mean—Purchase of 100 sheep at 30s. per head, £150; 5 tons 45 per cent. super, £24; total cost, £174. The balance-sheet at the end of the season would be roughly—Sale of lambs, 75 per cent. of sheep at the low figure of £1 per head, £75; 100 fleeces of 8lbs. at 1s. 6d. per lb., £60; income, £135. If we allow £25 for depreciation of sheep, making their saleable value £125, this would give a return of profit by stock on hand of £86, without taking into consideration the advantages the other stock would derive. As another example, how many times does the farmer bring his team into the stables when he is not working them to keep them in condition, because the feed is not good enough? During the course of the year, the cost of the chaff used for this purpose would balance the super bill. Where only a portion of a paddock has been top dressed, the difference in the feed on the dressed and undressed land can easily be seen from a distance. As to the time of application, I would apply the manure before the general break up of the weather, so that the feed would get a good start with the first rains. The experiences of reliable men are not wanting to show that, as a result of top dressing, the carrying capacity of a farm has been doubled, and even trebled. Another point of vital importance is that if the figures of the world's production of wheat for 1923 are studied, it will be seen that there is a large surplus held by the principal exporting countries, which will have an effect on prices, while on the other hand, the market for wool is high and likely to remain so for some time to come. I, therefore, conclude that the farmer must not depend on wheat or cereals alone to bring the highest interest on his capital, but with a system of top dressing, sheep are one of the main side lines to secure a better return per acre than at present. Many farmers have a small quantity of super left at the end of seeding, and they might, with advantage, experiment with top dressing a portion of a paddock."

COONALPYN.

May 16th.

An instructive evening was spent in talking over various topics of local interest.

LAMEROO (Average annual rainfall, 16.55in.).

May 24th.—Present: 16 members and visitors.

CORNSACKS.—Mr. Bertram, in a paper dealing with this subject, pointed out unfairness of the custom whereby the cereal grower was called upon to supply the container in which the produce was marketed at practically his own cost, whilst supplies of other forms of produce were permitted to make a charge for the package. The only return which the cereal grower received for the sack in which the grain was marketed, was the acceptance of the merchant of the weight of the corn sack as weight of wheat, which was about 2d., the sack in the first instance costing about 1s.

KRINGIN.

April 17th.—Present: 14 members.

HARVEST REPORT.—Mr. J. Guthleben reported as follows on the yields secured during the season 1923-1924:—"Early Gluyas on new land (the flats having been worked with a disc implement and drill, and sown with 62lbs. of seed and 70lbs. of 36 per cent. super) yielded 13bush. to the acre. Gluyas Late in the same paddock, but on land of a more sandy nature than the portion sown with Early Gluyas (sown in May with 60lbs. of seed and 70lbs. of 36 per cent. super, and then harrowed) yielded 13½bush. to the acre. Currawa was drilled on new land during May. The land was worked with a skim plough, and drilled with 42lbs. of seed and 70lbs. of 36 per cent. super, and then harrowed. It yielded 12½bush. per acre. German Wonder was sown on new land in May. The paddock was ploughed and then drilled with 50lbs. of seed and 63lbs. of 45 per cent. super, and finally harrowed. The yield was 12bush. to the acre. German Wonder was also sown on stubble land that had been worked dry with a spring-tyne cultivator in April, and drilled with 45lbs. of seed and 70lbs. of 45 per cent. super. The paddock was harrowed, and yielded 14bush. to the acre. Gluyas Late was sown on oaten stubble. The land was cultivated dry in April, and again during May. Sixty pounds of seed and 80lbs. of 36 per cent. super were sown to the acre. The land was harrowed, and returned 8bush. to the acre.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

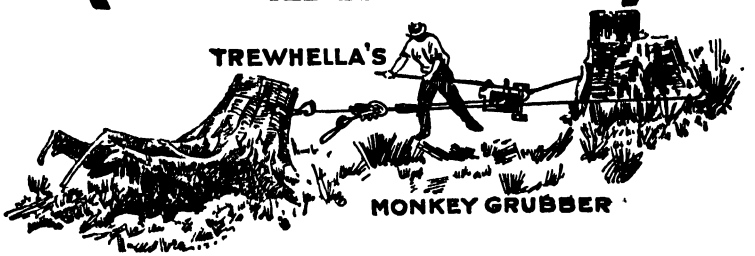
May 17th.—Present: 15 members and visitors.

FALLOWING.—In the course of a paper dealing with this subject, Mr. M. Thomas said one of the most important points in fallowing was to see that the plough turned the ground thoroughly. From 3in. to 4in. he considered to be about the correct depth for that district. He believed in harrowing immediately after the plough. If fallowing were done from about the end of July to September, it would assist the soil in retaining moisture, and allow weeds to germinate. If possible, the farmer should cross cultivate and harrow, in order to bring the soil to a level surface. He favored working the cultivator just deep enough to cut all weeds. A spring-tyne cultivator should be used if possible. If the weeds were too big for the spring-tyne cultivator, a skim-plough or disc cultivating plough could be used. A discussion then took place on the subject, "Implements for Working Fallow." As the summer had been a wet one, most farmers had trouble in keeping the weeds down, some used skim ploughs, and found them very effective, but the fallow set much more after skimming than where a spring-tooth cultivator has been used. It was agreed that fallow should be left "ridgy," because then it could be worked up more easily than when perfectly level.

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MURRAY BRIDGE.

April 15th.

The Hon Sec. (Mr. A. R. Hilton) gave a report in which were detailed the results secured with various fodder plants and vegetables that were being tested in the local high school gardens.

NEW RESIDENCE (Average annual rainfall, 12.50in.)

May 14th.—Present: 16 members and two visitors.

PICKLING WHEAT.—Mr. A. Kassulke read the following paper:—"Before seed wheat is pickled, care should be taken to obtain wheat of the best quality. All seed wheat should be cleaned twice, or graded, in order to ensure a good sample. The pickling solution should be prepared by mixing ½lb. of bluestone in 1½galls. of water to every bag of wheat. The wheat should be turned over with the shovel three times, and then left on the floor until the next day before being bagged. It is also advisable to have wheat pickled at least two days before it is sown." In the discussion that followed, Mr. P. J. Voigt said he never used more than 1lb. of bluestone to 9bush. of wheat. Mr. J. F. Schober, who pickled with a machine, did not think two days were sufficient to dry the wheat. Mr. H. Klau favored covering the seed with a tarpaulin. Mr. W. Schier pickled two bags of wheat with ½lb. bluestone and 4galls. of water. Mr. Kassulke, in reply to a question, said he always dissolved the bluestone in hot water. Mr. Eckermann also favored pickling on the floor. Mr. O. Klau favored putting a piece of salt in the pickle, because he considered that strengthened the pickle without damaging the grain. Mr. H. Klau always pickled on the floor, and had never had smut. The writer of the paper stated that he had discarded machine pickling in favor of treating the seed by shovelling on a concrete floor.

PARILLA WELL (Average annual rainfall, 16in. to 17in.).

April 21st.—Present: 14 members.

HARVEST REPORTS.—Mr. J. W. Johnston reported as follows on the returns secured by him from different fields of wheat during the year 1923-4:—Paddock No. 1, treated with 70lbs. super, yielded 23bush. 42lbs.; Paddock No. 2, dressed with 222lbs. super, returned 26bush. 40lbs; Paddock No. 3, which received 336lbs. super, harvested 26bush. 2lbs. Forty-five per cent. super was used in each test. Take-all was in evidence in the 70lbs. plot, but not in any of the others. Messrs. J. E. Johnston and J. S. Ferguson reported having sown oats on fallow with good results. Mr. Ferguson said oats (at the low price of 2s. 6d. per bush.), with their heavy yield, had paid equally as well as wheat. The feed value of the oaten stubble was far greater than that of wheaten stubble.

RAMCO.

May 19th.—Present: nine members.

SEEDING.—Mr. J. Boehm read the following paper:—"If fallow is to be sown it should be well cultivated or skim ploughed. Stumps should then be carted off the ground to prevent accidents to the drill. To drill wheat for a hay crop, about 50lbs. of seed with about 90lbs. of super, should be sown to the acre. If a mixed crop of wheat and oats is sown for hay, the best plan is to drill the wheat one way, and then cross drill the oats. The wheat used for a mixed crop should be an early variety, otherwise the oats will be too ripe by the time the wheat is ready for binding. Wheat sown for harvesting should be pickled before it is sown, and then drilled in at the rate of 40lbs. of seed with about 60lbs. of manure to the acre. Barley sown early is a good fodder, but for hay it must be cut before it is too ripe." A short discussion followed. *Life Membership.*—Mr. J. J. Odgers (Hon. Secretary of the Ramco Branch) was presented with a Certificate of Life Membership of the Agricultural Bureau.

WYNARKA.

April 16th.—Present: 12 members and visitors.

THE AGRICULTURAL BUREAU.—Mr. Murphy read the following paper:—"During the whole term of my membership, I have never attended a meeting without getting some help from the Bureau. I have come in contact with people both

in and out of this district who were sceptical regarding the work of the Bureau. In this district, I have been asked, "What good does it do you?" yet the same people have asked me to secure the opinion of the Bureau on a certain subject, or they have suggested that the Secretary of the Bureau should write to the Department of Agriculture and obtain the information from the expert officers. The *Journal of Agriculture* is most useful to the farmer. Among the things that I look forward to at each meeting are the communications received from the Department of Agriculture. I feel that if one acts upon the advice received from the various experts one cannot go very far wrong. To have a real live Branch, each member must be prepared to do his share of the work. It does not matter how short the talk or paper is that is brought forward, because some of the best discussions come from the briefest talks and papers. Above all, the Branch must have a live Secretary; he is the man on whom the success of the Branch hinges. The Secretary should keep in touch with the Department of Agriculture, and write to the various experts for their opinions regarding various matters that crop up at each meeting. Such a Secretary is a great asset to the Branch."

GLOSSOP, May 23rd.—The Hon. Secretary (Mr. G. C. Jackson) read a paper from the *Journal of Agriculture*, "Irrigation," and a lengthy discussion followed. The delegates to the Murray Bridge Conference gave an interesting report of the proceedings of the gathering.

KRINGIN, February 21st.—The inaugural meeting of the Kringin Branch of the Agricultural Bureau was held at the residence of Mr. H. Guthlehen, when Mr. F. C. Richards, of the Department of Agriculture, was present, and delivered an address in which he explained the work of the Agricultural Bureau. A short paper, "Preparing the Seed Bed," was read by Mr. Correll.

LONE GUM and MONASH, April 16th.—Twenty-two members and several visitors attended the April meeting. Mr. W. F. Partridge delivered a short address, "A Talk on Sultanas," and replied to a number of questions. The subject "Winter Irrigation" was also discussed.

MOOROOK, May 23rd.—A paper from the Conference of River Murray Branches, "Factors Affecting the Yield of the Vineyard," was read, and an interesting discussion ensued.

MYPOLONGA, May 26th.—At the monthly meeting of the Branch, arrangements for the forthcoming Pruning Competitions were discussed.

NETHERTON, May 16th.—The subject "Top Dressing Pasture Land" was brought forward for discussion. Several members mentioned that it was their intention to carry out top dressing experiments during the coming season.

PARILLA WELL, May 20th.—Mr. J. S. Ferguson read a paper, "Rotation Cropping," and a good discussion followed.

PARILLA, May 23.—Mr. H. G. Johnston read an instructive paper, "Management of the Farm," and a keen discussion ensued.

TAPLAN, May 13th.—Several subjects of local and timely interest were brought before the meeting, and an interesting discussion followed.

SOUTH AND HILLS DISTRICT.

CURRENCY CREEK.

May 16th.—Present: 13 members.

QUESTION BOX.—The meeting took the form of a Question Box. "Which is the best cross for lambs for export?" Members were divided as to which was the better ewe, the Merino or the Comeback, but all favored the Shropshire ram. "Best method of pickling wheat?" Most members favored treating the wheat in bags in a tub. "Is it a good practice to have a stack of hay in reserve each year?" It was agreed that fodder should be conserved, but pre-

cautions should be taken to protect the stacks from mice. "Best method of hand-feeding sheep?" If nothing else was available, members thought troughs made from bags would be quite suitable. "The best pig for farmers to keep?" The Berkshire was favored as the best breed of pigs for the farmer. "Which is the best cow for the farmer in this district?" Members favored the Shorthorn.

KANGARILLA.

April 17th.—Present: 15 members.

MANURING THE LAND.—The following paper was read by Mr. M. A. Bottrill:—The increased demand for hay and chaff calls for the best that can be produced from the soil. Some soil will give good returns without manure, whilst applications of manure will not make any appreciable difference to other soils. Green manuring is a considerable help in soil that is too stiff and heavy, but where stable manure is plentiful, the soil will benefit to a greater extent. The difference between farmyard manure and chemical manure is that the maximum effect of farmyard manure is not felt in one season, and if it were omitted the second year, very little difference would be seen. With chemical manure the greatest effect is noticed in one season, and if omitted for one year, the crop would be diminished, perhaps by one half. Cowyard manure, if kept dry, can be put through a sieve, and will run through the drill in the usual way. If dry cow manure is carted from the paddocks and put in the cowyard where the continual tramping of the cows will break it fine enough, it can be used in the drill. The manure of young animals is poorer in fertilising matter than that of a full-grown animal, because the young animal requires nitrogen, potash, and phosphates to build up its bones and flesh. Working animals give better manure than fattening animals. Milking and pregnant animals give poorer manure. The kind of food has a very great influence on the quality of the manure. Foods that contain the most nitrogen are of the most value—beans, peas, bran, oats, wheat, and barley produce good manure, but the straw of peas, oats, barley, and wheat produce a bulky but poorer manure. Urine of animals is generally of more value than solid manure, and the more urine there is contained in the dung, the better it is. Liquid manure is very similar to artificial and chemical manures, because it is in solution and acts quickly. Poultry manure is very strong and quick in action. In its dry condition it is more like guano than any other fertiliser. For top dressing, it is very valuable, and it is only necessary to use it in small quantities." An interesting discussion followed.

LONGWOOD (Average annual rainfall, 37in. to 38in.).

May 17th.—Present: 6 members and visitors.

THE FRUIT INDUSTRY.—The monthy meeting was held at the residence of Mr. W. Nicholls, when Mr. H. A. Griffiths, in the course of an address dealing with the above subject, said for quality, texture, and color, South Australian apples were without parallel, and with a view of stimulating trade with New South Wales, he suggested that growers should establish a co-operative packing shed, with a capable man in charge, and a staff of careful packers. The apples should be put up in cases which were attractive, and with cleated ends to allow for a free circulation of air whilst in the cool chambers. A light, strong make of case, without hard wood, so far as possible, was preferred for the interstate trade. He suggested a brightly-colored label depicting a grower's garden with the words, "South Australian Grown Fruit," with spaces provided for the insertion of the kind of apple, grade, and quality contained in the case. He also suggested a central despatch depot to dispense with indiscriminate consignments of fruit from individual growers. That would enable the producers to regulate the number of consignments going forward, and so prevent a glut on the Sydney markets. The South Australian apple had come to stay on the Sydney market, and very profitable business would result if care were exercised in getting up an attractive article, and keeping faith with the purchasers. An interesting discussion ensued, and it was resolved that a scheme should be evolved to hold the trade with New South Wales.

McLAREN FLAT.

May 15th.—Present: 37 members and 3 visitors.

MARKETS FOR FRUIT.—Mr. G. Ward read the following paper:—"*Apricots.*—For the apricot there is a fair fresh fruit market. In years of glut the price drops to about 3s. 6d. per case for good fruit, and in poor seasons the price will reach about 10s. per case. The grower should remember that when the price reaches 10s. per case, the crop will only be about one-quarter that which it would be in a good season, and during the good seasons there is a difficulty in disposing of the fresh fruit, so that drying becomes necessary. The price for the dried article does not vary like that for fresh fruit, for, while the latter is 3s. 6d. per case, the grower will get about 10d. per lb. dried. A case of fresh fruit will produce about 8lbs. of dried, returning 6s. 8d. per case. Up to a certain limit, fresh and dried fruits can be handled at about the same cost. Dried fruit commands a good sale at about 1s. per lb., and the export market to England is fair. *Prunes.*—If prunes are planted, the grower has about eight years to wait before any return is received. At present, there is a good local market at about 6d. per lb. off the drying trays, which is a good price, but it is necessary to look further afield than the Commonwealth, for in about six years I think the Australian requirements will be supplied. Once the Australian market is supplied, the grower is up against the American goods, which are quite as good as ours, and packed very much better. The American grower pays higher wages than we do, water rates are higher, and land is quite as dear, yet how does he successfully compete with us? First, the producer grows prunes only, and he is quite sure they will grow before he plants them, and his returns are about 2 tons of dried fruit per acre, and all he does is grow and dry them, for they are treated in

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bulk. The chief consideration is the quantity that can be consumed in America, the surplus export may just cover growing expenses. We are not in the same position with such a small population. If planting goes on at the rate it is, in 12 years we will be exporting, say, 50 per cent, and will have to compete with the American article. The Australian fruit exported would only return the grower, c.i.f., London in boxes, £45 per ton. *Currants.*—The writer planted currants in 1900, and that year and a number of years following the price was 4½. per lb. through the winnower, in sugar mats. Wages were not so high as at present, 5s. per day being the ruling rate. In those days the consumption of currants in Australia was about 5,000 tons, and is still about the same to-day. We were then importing about 3,000 tons, and to-day we are exporting about 8,000 tons, which in the near future will be more. What is to be done with the surplus currants? We have a sale in New Zealand for about 1,000 tons if we can place it there at the same price as the Grecian fruits. South Africa also wants currants if we can supply at the same price as they can buy elsewhere, but their market does not stand for much, as they can grow grapes and currants as well as we can with the advantage of black labor, and before long they will be competing against us instead of buying. The only market at present of any importance is in London. During the war and just after the declaration of peace this market was very good. The Grecian fruit was not available, and very good prices were obtained, but now conditions are returning to normal, and reduced prices are ruling. At the present time England consumes about 20,000 tons of currants per year, and last year we supplied about 15 per cent. of that amount. I should say that for good 3-Crown currants, we will find a market for the surplus for some time to come at about £50, c.i.f., London. The outlook for 2-Crowns does not appear so satisfactory, because it will have to compete with the Greek bulk article. This proves that the grower must produce currants at 3½d. per lb. off trays. A poor yield in the Greek vineyards will make it better for Australia in the London market. Currants can be grown at 3½d. providing the grower can get an average of 1½ tons per acre per year. *Sultana and Muscat Raisins.*—These can be grown in the district, but not to advantage, and I do not think it wise to deal with them. In the first place, they ripen too late, and secondly, the land in this district is not suitable to produce a good class of raisin. Wine grapes can be well grown in this district, but as prices have been on the downward grade for the last three years, one hesitates to advocate any additional plantings. If there were 25 per cent. less Doradillos than there are to-day, things would be much better. A certain quantity of Doradillos is wanted each year, but after that is supplied, there is very little demand for them. They are not much good for wine making. Some winemakers use them for making hock, but they are chiefly used for making fortifying spirit and brandy. Say, for instance, 1,000 tons of Doradillos are required for making brandy, and 2,000 tons for spirit, the remainder of the crop is of very little value, because the winemakers produce a lot of poor wine which has to be used for making spirit, and in a year such as has just been experienced, only 25 per cent. of the black grapes will make wine fit for the distillery. With this season's grapes, decayed and rotten, the vigneron who manufactures dry wine, will have a lot of juice fit only for the distillery. This is against increased production of Doradillos. The makers of sweet wine are the only manufacturers looking for spirit. Here again, the season has interferred. The grapes have not ripened, so that it has not been possible to make a good sweet wine. The best of the grapes will be used, the remainder put through the distillery, to the disadvantage of Doradillos. In 1920, spirit was costing wine makers 13s. per gallon, and could not be procured. To-day, however, all the wine makers have enough spirit to carry them through the vintage. The distilleries are full, and spirit can be bought for 4s. per gall. The Doradillos have, as it were, spoilt the spirit sale. What about the London market? England consumes about 12,000,000galls. of wine per year, and of this we supply some 700,000galls. of dry wine, and consequently it does not help the Doradillos. Australia is making something like 10,000,000galls. of juice per year, and exporting a little more than half a million, the remainder is either consumed or stocks are accumulating. If the Government assisted with an export duty on sweet wine it would help, but we will have too many Doradillos for the next 10 years, if not another vine is planted. In concluding, I would say that at the present price of spirit, Doradillos may soon be grown profitably for manufacturing motor fuel."

McLAREN FLAT.

June 12th.—Present: 26 members.

ADVICE TO ORCHARDISTS.—The following paper was read by Mr. G. Ward:—"Apricots do best in a good loamy or sandy soil, with a red clay subsoil, about 2ft. or 3ft. from the surface. If closer than this, some of the trees, in a wet season, will in all probability die. Currants and grape vines can be grown successfully on a greater range of land, but they will do better and last longer in land that has about 1ft. of sandy soil overlying clay. Prunes do well in this class of land, and will grow well in fairly wet soil. If the land is wet, and of a dark sandy nature, with tea-tree growing on it, it will produce good potatoes in the autumn, but not in the spring. If the land is only of fair quality, and the clay near the surface, a few underground drains will carry off the water, and it will grow vines, pears, and prunes. If apricots and currants are to be planted, start clearing the highest and driest portion of the block. If potatoes, vines, or prunes are planted, clear the lowest and wettest portion of the block. Most beginners are inclined to select a spot on the block and plant about 10 different kinds of trees, saying that it is not wise 'to have all your eggs in one basket,' but, with such a mixed orchard, endless work will be incurred, and not enough of one variety of fruit will be produced to be of very much value. I advise planting three acres of Moorpark apricots with a few trees of some other varieties that bloom at the same time, for pollination. Apricots will give a small return the fourth year, and if the fruit is dried, the trays can be used for other fruits later on in the season. Five acres of currants would be a fair start. Most blocks of 25 acres have a long side and a short end. Start with the apricots, taking the full width of the orchard, and then currants can be planted across the block. That is to say, start on the highest and driest ground on the south end, and work across it towards the lower corner, in the northern end. The land will be running north and south, and the rows of trees and currants will be worked east and west. By adopting this method of planting, the dry land can be worked early in the spring, and the wetter land can be cultivated as the dry season advances. Too often wet and dry land is noticed in one block, and the land that is ready for working cannot be cultivated on account of wet patches. In preparing the land for the orchard, the first work is to grub the timber and undergrowth. Yacca and tea-tree should be taken out by the roots. Small bushes can be dealt with by a heavy disc plough. All green timber that has large roots within half a chain of the fence should be grubbed, otherwise vines or trees within that distance of the fence will not thrive. Plough the land 6in. deep with a disc plough. Care should be taken that all roots that have been missed by the grubbers are removed. Care should also be taken to obtain the best young trees and vines one year old, and well rooted at the bottom. The grower should bear in mind that roots as thick as a small piece of string will have a better chance of starting than those with roots as large as a lead pencil. Trees or vines should be planted in straight rows, with an even distance apart between the rows. If a planting wire is used, this is quite an easy matter. Plenty of room should be allowed on the headlands—30ft. for trees and currants. However, when the trellis is erected this will be reduced to 24ft. When planting, prune off all damaged roots, and shape them evenly. It is not necessary to cut tree roots back to any extent, because this is often done to excess when trees are taken out of the nursery. Vines, if taken up carefully, have all their roots on them. All side roots should be cut off, and all those that start from the bottom two buds should be cut back to 3in. The best time to plant trees is about a fortnight before they break into leaf growth. Vines in limestone country should be planted early in July, but for this district I favor September and October. Apricots do the best when planted 20ft. apart each way. Dig the hole about 2ft. across and 1ft., or a little more, deep. Give each tree about ½lb. of bone super; place about 3in. of earth on the manure, put the tree on this, and distribute the roots as evenly as possible. Take care not to plant the tree more deeply than it was in the nursery. Prunes are planted in the same way. I suggest planting 90 per cent. D'Agen and about 10 per cent. Robe De'Sargent, or Spendour for pollination. Zante currants should be planted 12ft. apart each way. Dig the holes 1ft. square, give each hole not more than 2oz. of bone super, place about 2in. of soil on this, plant the vine, fill in the earth, and when tramping keep a slight upward strain on the vine to cause the short

roots to be the lowest at the extreme end. Wine grapes are planted in the same manner, but not quite so far apart—spur vines, 10ft. x 6ft.; trellis vines, 10ft. x 7ft. After planting, work the land thoroughly with a spring-tooth cultivator. If the soil should start to drift, leave the ground as rough as possible. The application of a few loads of old straw, manure, or clay will soon stop the drift."

MOUNT PLEASANT (Average annual rainfall, 26.87in.).

May 9th.—Present: five members.

FALLOWING.—A paper on "Fallowing" was read by Mr. C. O. Royal. In the discussion which followed, Mr. M. McCallum said that fallowing was a good proposition, and it should be more extensively practised in their district. It enabled a farmer to get the seeding done earlier, and heavier crops resulted. Mr. V. R. Tapscott asked whether it was necessary to wait a fortnight or so after the first rains before commencing seeding on fallow land, in order to allow weeds to germinate. Mr. Royal replied that he considered it best to get the seed into the ground as soon as possible to enable it to get a good start before the cold weather commenced.

SHOAL BAY.

May 21st.—Present: 10 members and visitors.

A large number of members, including representatives from the Cygnet River Branch attended, when matters in connection with the proposed Conference of Kangaroo Island Branches were discussed.

PREPARATIONS FOR SEEDING.—A further meeting was held on June 11th, when Mr. A. Barrett, in the course of a paper dealing with this subject, said all implements should be overhauled so that the work could be done thoroughly and without delay. Next, the land should be cleared of all rubbish, which should be stacked in heaps and burnt. Ploughing should be commenced with the first rains, and the land left for three to five weeks to allow all weed seeds to germinate. The land should then be ploughed a second time, sufficiently deep to bury all weeds. Finally, it should be cultivated to form an even seed bed, and kill any remaining weeds. He favored drilling at the rate of 1cwt. of super to the acre, and one bag of barley to three acres. Next, the land should be harrowed, and, if possible, cross harrowing should be carried out. When the crop was well stooled, it should be rolled to settle the ground, which tended to conserve the moisture, and prepare a smooth surface for the harvesting machinery. On limestone loam soils, and those of a heavy clay nature, he advised ploughing to a depth of 4in., but sand soils should not be ploughed a greater depth than 2in. In the discussion that followed, Mr. Balchin did not consider deep ploughing necessary. Mr. Turner considered the cultivator the most suitable implement for sandy land. Mr. K. Bates considered a second ploughing unnecessary. Mr. Noske did not think it advisable to allow the land to remain idle after the second ploughing, seeding should be carried out at once. Mr. Beck was of the opinion that heavy land needed deep ploughing.

TWEEDVALE.

May 15th.—Present: 18 members and visitors.

LAND DRAINAGE.—The following paper was contributed by Mr. W. H. Fechner: —In districts where there is excessive rainfall, it is necessary to drain surplus water off the land, otherwise it becomes sour, and small roots of young plants become inactive, and very often decay. To drain a hillside is quite a simple matter, the surplus water naturally flows to the bottom, but to drain flats or low-lying country it is necessary to bring the water into a body. This can be done by ploughing the paddock into "lands." The width of the "lands" should be regulated according to the slope. Where almost level country is drained, the "lands" should not be more than 18ft. wide, but as the slope increases, the width of the "lands" can be increased until a width of 30ft. is reached. Even on a hillside, it is not advisable to go to any greater width,

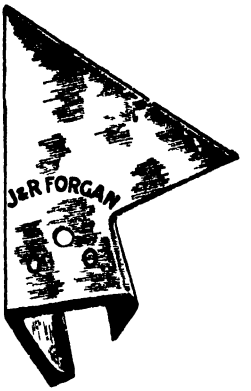
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because if the "lands" are too wide, the amount of water that collects in each furrow becomes too great, and often washes soil away. The crown or centre of the "land" should be kept as high as possible when ploughing. A paddock should always be cross-harrowed, which will have a tendency to give the "lands" a gradual slope from the crown or centre to the furrow, and thereby allow the water to accumulate more easily into a body and flow away. In the discussion that followed, Mr. F. E. Hein spoke at length on underground drainage which he considered essential on low-lying ground and flats in that district. He preferred 3in. earthenware pipes, placed about 15in. to 18in. under the surface. V-shaped drains were excavated in order to allow a small drain under the pipes. Mr. E. S. Miller, who had been experimenting with underground drains, considered bricks the best material for underground drains. He advised standing two on the side and one flat across the top.

URAIDLA AND SUMMERTOWN (Average annual rainfall, 44.25in.).

May 5th.—Present: 10 members.

ONION CULTURE.—Mr. F. Sharp read the following paper:—"For the gardener who intends raising onions as the main line of vegetable growing, the best plan is to raise seed on the holding, then he will be able to decide on a variety to suit local conditions, either a good early sort or a good long keeper. When selecting onions for seed, it is advisable to pick out a few good bulbs each time the onions are being prepared for market. During September, the selected onions should again be examined, and the best onions planted. The onion chosen for seed should be one that is of a good shape, fairly round, with a raised crown, because these are not so liable to rot through water getting into the crown, neither will they get burned by the sun so quickly. Always pick out firm bulbs, because the harder and firmer the onion, the better keeper it will be. It is not necessary to pick out onions for seed every year, they can be allowed to remain in the ground year after year. When the seed is cut, the stalk must be bent downward to prevent the water getting down inside the bulb of the onion. Onions should be planted for seed no later than September. Plant in rows about 18in. wide and 12in. between the onions. It is advisable to plant the crop for seed where it can be watered. A good watering when the plants are coming into flower will help to increase the amount of seed. The seed should be cut when the small pods begin to crack and the black seeds begins to show, or when the stock of the seed onion begins to turn yellow. The seed that has been cut off should never be left in a tin, because it will sweat and spoil; always put it in a bag or spread it out upon a sheet of iron in the sun. Rubbing it two or three times a day will help to dry it more quickly. Always take it in over night so that it will not become wet. Never cut seed whilst it is wet. The best way to clean onion seed, after it has been removed from the pods, is to put it into a dish of water, the good seed will sink to the bottom, whilst the weak and inferior seed will float on the top. This can be skimmed off and thrown away. Then take the good seed out, spread it on a piece of tin to dry, taking care that the drying is done thoroughly and as quickly as possible. Always keep a small quantity for the next year in case the seed proves to be a failure. Growing onions from seedlings is not very successful in the hills. The best time to start planting out is at the beginning of August, if not much water is available, because planting early will give a better crop than planting in October. Where there is plenty of water late planting is better, because the ground is more easily kept free from weeds. The best way to plant onions, if plenty of water is at hand, is to sow the seed at the beginning of September with the seed sower. Sow thinly, so that the plants will not require much thinning out, then with plenty of water and manure a good crop should be assured. The land should be ploughed six weeks to two months before the plants are ready. Plough in a good dressing of stable manure at that time, so that it will be well rotted by planting time. Leave the land in a rough condition to allow the air to penetrate into the soil. A fortnight before planting, give the ground another good dressing of bone dust, plough this in, and leave the land until planting is commenced. When the plants are ready, harrow, roll, and scarify the ground.

Then if it is not fine enough, rake it, and then finally drill out and plant. More manure, if necessary, can be distributed by hand, and then raked in. When the onions start to grow, hoe bone super into the ground, and give the plants a watering. Onions should be planted 6in. between the rows and 3in. between the plants. If the plants cannot be irrigated, plant 10in. between rows and 4in. between the plants. Care should be taken to keep the weeds well under control. The best plan is to give the plants a good soaking rather than many small waterings. If the soil is inclined to be stiff and solid, best crops will be obtained by shallow planting just deep enough to cover the roots. In loose soils, deeper plantings can be made, because the bulb will force its way up to the surface. *Storing and keepng onions.*—To keep onions successfully, the first point of importance is to select a good keeping variety. The best place for storing onions is in a loft running from north to south, leaving both ends open, and with a floor with boards about 1in. apart, so that plenty of air can circulate through the bulbs. Onions can be placed in heaps provided the loft is about 6ft. wide at the bottom of the heap and then tapering to a point up to 3ft. deep. For storing, the onions should be cut with a stalk of about 4in. attached; this helps to keep them apart, and provides for a free circulation of air. Onions must be taken out of the ground when they are ready, *i.e.*, when nearly all the green color has disappeared from the tops. This very soon takes place after the onion tops have fallen. The crop should always be carted in the same day that it is taken out of the ground. Onions should always be handled carefully. They should never be taken up when there is a heavy dew, or when it is raining. Cover them with rubbish whilst they are lying upon the ground. Applying too much water after the crop starts to go down is a mistake, because it will tend to start growth more quickly than those who do not receive water. As soon as the onions start to go down, they should be given a good watering for the last time, and then allowed to 'bulb.' ''

BLACKHEATH, May 16th.—The meeting took the form of a ''Question Box'' evening, when a number of subjects of local and timely interest were brought before members, and an instructive discussion ensued.

CLARENDON, April 14th.—Various subjects of local interest were discussed, after which Mr. W. Nicolle initiated a debate on the subject, ''Merino *v.* Crossbred Sheep for the Hills.'' Mr. H. C. Harper spoke in favor of the Crossbred. After hearing the two speakers, members were of the opinion that the Merino was the type of sheep best suited to the conditions of the Hills District.

IRON BANK, May 24th.—The meeting debated the subject, ''Spraying.'' It was generally agreed that to ensure clean fruit two sprayings of bluestone should be given in the spring. Other subjects of local interest were also considered.

HARTLEY, April 16th.—The monthly meeting of the branch was held at the residence of Mr. J. M. Hudd on April 16th. There was a large attendance of members and visitors. After the formal business of the meeting had been transacted, Mr. D. F. Westwood (Chairman) presented a morris chair to the Honorary Secretary (Mr. W. B. Hudd) on the eve of his marriage as a mark of appreciation of the services that he had rendered to the local Bureau. Games and supper terminated a very enjoyable evening.

TWEEDVALE, June 19th.—The Director of Agriculture (Professor Arthur J. Perkins) attended the meeting. Thirty-four members and 14 visitors were present to hear the Director's Address, ''Top Dressing Pasture Lands.''

SOUTH-EAST DISTRICT.

FRANCES (Average annual rainfall, 20.74in.).
April 26th.—Present: 10 members.

STABLE AND SHEDS FOR BEGINNERS.—Mr. L. Krahnert read the following paper:—''For a combined stable and chaff shed, procure good solid forked posts 11ft. long to the inside of the fork, and for the centre of the shed not less than 15ft.,

in order to give a 'pitch' of 4ft. to the roof. All forks should be not less than 3ft. in the ground. A convenient-sized chaff shed, say, for six to eight horses, is 18ft. x 20ft. The same width of building is quite enough for the stable. Have a manger 2ft. wide, and allow 3ft. for a gangway so that the horses can be fed from the front. If the chaff shed door is in the correct position, it only takes a few minutes to feed the team. Divide the stable into stalls 6ft. wide, and fasten all the horses. If a couple of loose boxes, say, 9ft. x 11ft., are built at the end, they will be found a great convenience when foals are being reared, because there is always somewhere to keep them safe whilst the mares are working. For covering for the stable, I advise battens 2ft. apart covered with 1in. or 1½in. mesh netting to keep sparrows out of the straw roofing. In order to get the posts the same height, measure the first post from the inside of the fork, say 7ft., then place it 3ft. in ground. By measuring all the posts, and using a straight edge and spirit level from one post to the other, a neat job can be made with bush timber. The depth of the holes can be measured by using a light stick or pole. For the machinery shed the same size building will suffice, with this difference, that each division must be made wide enough to accommodate each machine, such as the binder, harvester, drill, &c. Be sure and keep all harness and machinery under cover." Mr. Krahnert gave a demonstration with loaf sugar and fine sugar on the benefit of keeping the top of the fallow worked.

KONGORONG.

May 19th.—Present: 14 members and visitors.

POULTRY ON THE FARM.—In the course of a short paper dealing with this subject, Mr. A. Boardman spoke in favor of White Leghorns for the farm. With proper care and attention birds of that breed would commence to lay at four months old, and if hatched during September or the first fortnight in October, would continue to lay until well on into the winter. He expressed a preference for oats to form the bulk of the feeding ration. Crushed bones made an excellent addition to the food for the hens. Green bones should be broken with a hammer. Fowl manure was a very good fertiliser, especially for clovers and grasses. Referring to ducks, Mr. Boardman favored the Indian Runner, because they were a good egg-laying breed.

MOUNT GAMBIER (Average annual rainfall, 32in.).

May 10th.

PLANTING PINE TREES.—Mr. A. J. Hemmings read the following paper:—"However important it may be to know how to care for growing trees, and how to remove them when they have reached maturity, it is equally important to know how to plant them so as to ensure their successful growth. It will be readily admitted that it is desirable that seedlings for transplanting should be reared in close proximity to the land on which they are to be planted, because the seedlings so grown can be removed from the nursery as they are required for planting out, and the risk of loss or injury in conveying them to the planting ground close by is less than otherwise would be the case. The seed to be sown in the nursery plays a part that is of prime importance. It is, therefore, necessary that only good seed should be sown. If seeds are to be extracted from cones, care must be taken in their selection. Those growing on good, matured trees are to be preferred. These should be gathered in the early summer months, the earlier the better, but not before they have a brown appearance and all traces of green have gone. The selected cones contain the seeds, and these can be extracted by exposing the cones to the heat of the sun, which has the effect of opening the cones, and releasing the seed. It will be found a good plan to spread the cones out on a tarpaulin or sheet, but protection against possible raids by mice, fowls, and birds is imperative. On no account should the cones be placed in a hot oven because the effect upon the seed is bad. Pine seed should be sown from late July to early September. Germination will take place in from three weeks to seven weeks, according to weather conditions. Seedlings required for small plantations, such as are established by farmers and landowners.

can be raised in small plots in the household garden. When, however, larger quantities are required for commercial planting, seed should be sown in an ample plot that will permit of making rows 18in. apart and lines of considerable length. Approximately from 100 to 120 seeds should be sown to the lineal yard, and with good germination 80 to 100 seedlings per lineal yard should result. These can remain in the nursery until the following June, when they will be ready for planting out. Care of the seedlings need only be slight, but it is desirable that the lines should be kept free from weeds, and the top soil stirred after rain in the summer months, so that the moisture is retained in the soil. More frequent stirring of the top soil will be necessary if the normal summer rains do not come. No attempt whatever should be made to plant trees on land from which rabbits have not been cleared. When grass is plentiful the rabbits destroy the young pines by nipping off the tops, and in the summer months, in their search for moisture, they bark the pines from top to bottom. The intending planter should be careful, therefore, to rid the land of this pest before operations are commenced. The most suitable land for pine planting is that which possesses good top and subsoils. The South-East abounds with sandy soils, most of which are favorable to splendid growth of the Remarkable Pine (*Pinus insignis*). Land with a stony subsoil is not so good, and its use for this purpose should be avoided if it is possible to do so. The chosen land should be securely fenced, cleared of rubbish and vermin, and ploughed. Ploughing will check the growth of natural herbages, and help to retain moisture until the trees get a good start. It will be an advantage to lay the land off in blocks of not more than 10 acres, leaving ½ a chain break on either side, and from 1 to 3 chains on the outer side, according to the nature of the adjacent lands. Breaks in grass land should be 1 chain wide, and kept ploughed, but in timbered country ploughed 3-chain breaks are requisite. If trees to be plainted are procured from the Woods and Forests Department, it is desirable to make an early application, enclosing a postage stamp for reply, without which requests for trees are not entertained. Trees from the local distribution nursery should be heeled in thinly for a few weeks before being planted out. This helps the trees to recover from the first shock of transplanting, but in transplanting trees grown in your own nursery "heeling in" can be dispensed with. Wrenching of young pines is only necessary in the case of two-year-old trees, and it should be done five or six weeks before planting is intended. Finally, before planting pine trees, the roots should be puddled. This process consists in dipping the roots of the trees in a "puddle." The puddle should be composed of the best soil obtainable —a red loam preferred—mixed in a box or tub with water until of the consistency of thick gruel. So soon as the trees are lifted from the soil their roots are immersed in the "puddle," which must be kept well stirred, and when the roots are thoroughly coated with "puddle" the trees are withdrawn and placed under cover ready for transport to the planting ground, either by hand or vehicle. Every care should be taken to protect the trees in all the various operations of lifting, "puddling," and transport, because tender trees cannot withstand either wind or sun. A fruitful source of much disappointment is non-observance of these essential rules when planting pines. Fruit trees may be carelessly handled at certain seasons of the year without any apparent ill effect, but carelessly handled pines will invariably suffer from ill treatment. It will be found an advantage to use boxes for transport of trees, and to have the lids on them, to effectively cover the trees whilst being moved for transplanting. Before placing the trees in the ground, dig the ground well, sift out fern, and other roots or weeds, and form a bed shaped like a shallow basin or dish, dig out a wedged-shaped spit in the centre of same, and insert one pine, not more, quickly, in order to save exposure. Quickly straighten out the roots, fill in the soil, and firmly tread it in with the feet. The roots should be straightened, because crooked ones retard the tree in its development. Firmed soil acts as a support and prevents air reaching the roots. The depth to which the tree should be inserted in the spit will be 1in. to 3in., according to the size of the tree, deeper than when it grew in the nursery. This is to allow for the settling of the soil which follows when rain falls. *Planting trees.*—Trees should be planted in straight rows—at least one way—for several reasons, especially for cleaning between them when desired and convenience in removing certain trees if required before the milling of the whole area. Indeed very little care or trouble is needed to keep trees in line every way, if planters are provided with correctly measured

poles, and careful me· using on their part is observed. In planting *Pinus insignis* for plantations, it is re ommended that plants be spaced 8ft. by 8ft. For shelter and shade they may be planted from 20ft. to 30ft. apart to allow for spreading. It is a good idea to space alternately, where more than one row is being planted for shade. Very little now remains to be done, but await developments. It will be necessary, of course, to keep an eye on the area, that no rabbits gain access through burrows or holes in the netting, and for the first year to replant misses, should there be many. A strict observance of the foregoing should, however, obviate the necessity for replanting. Fire breaks must be ploughed annually. This is important, and money well spent, for if fire takes even one block, at say, 10 or 12 years old the monetary loss will exceed by a great many times the cost of keeping firebreaks effective by ploughing. Having given some general ideas of planting pines, for the benefit of those who wish to plant other kinds of trees I shall briefly explain methods of rearing and planting that have proved successful. Acacia seeds (wattles, blackwood, &c.) should be placed in a small calico bag, and placed in a pot with water already boiling. Allow the bag with the seed to remain in the boiling water for two minutes, and then remove the bag. Place it on a sack and pour the boiling water over and then wrap the sack around the bag containing the seed. This can be placed on one side for, say, 24 hours, when it will be found that most of the seed has commenced germination, and can be then sown. This sowing can be done either in the early spring or in early January. Sowing in January, however, will necessitate watering the seed and young plants frequently. A cover of woodheap manure, from which all chips have been removed, will serve as a means of retaining moisture, The trees, whether from seed sown in early spring or early January should be ready for planting the following June. Eucalyptus seeds of all kinds can be sown on being taken ripe from the tree, and can be treated in the same way as acacia seed, except that they must not be boiled. Whether the seed is sown in early spring or January the seedlings will be ready for planting the following June. All kinds of evergreen trees, when raised in beds, should be taken up and "puddled," and in every respect should be treated in the same way as pines, when preparing them for planting, and especially must they be covered when in transit from nursery to the planting area. Where only a few trees are required, these may be raised in bamboo tubes, and the trees planted in their place with the tubes. This obviates the necessity for "puddling," and avoids a great amount of risk from exposure. Plants may also be raised in boxes and transplanted with a small sod by removing with a large spoon or small scoop into holes already prepared. Trees raised by the last-named two methods are usually smaller, and are not so well fitted to stand the battle of life against weeds, &c., as trees grown in beds, but are equally as successful, if additional care is given them during the first year by keeping weeds down, and occasionally hoeing that they may become well established the first year, after that they will care for themselves."

ALLANDALE EAST, May 23rd.—An interesting evening was spent in discussing the subject "Top Dressing Pasture Lands," and several members stated that it was their intention to experiment with super on grass lands during the coming season. Samples of "Snowflake" potatoes were exhibited by Messrs. Griffin & Kieselbach.

KALANGADOO, May 12th.—Mr. Messenger read a paper, "Calving Troubles," and a good discussion followed. Mr. Rogers stated that he had found a drench consisting of fresh milk and ground charcoal an excellent remedy for cows that had not "cleaned" properly.

KALANGADOO WOMEN'S, May 12th.—Various topics of local interest were discussed at the monthly meeting. It was decided that the branch should compete in the Bureau District Exhibit Competition to be held at Mount Gambier during October.

NARACOORTE, April 12th.—Mr. S. H. Schnickel read an instructive paper, "Vegetables and How to Grow Them." A keen discussion followed.

TANTANOOLA, June 7th.—Mr. E. J. Pryor read a paper, "Boys and Girls' Clubs." The aims of the clubs were explained by the writer of the paper, and reference was made to the success that had attended the introduction of boys and girls' clubs in Canada and the United States of America.

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